contractors and engineers monthly

NOVEMBER 1952

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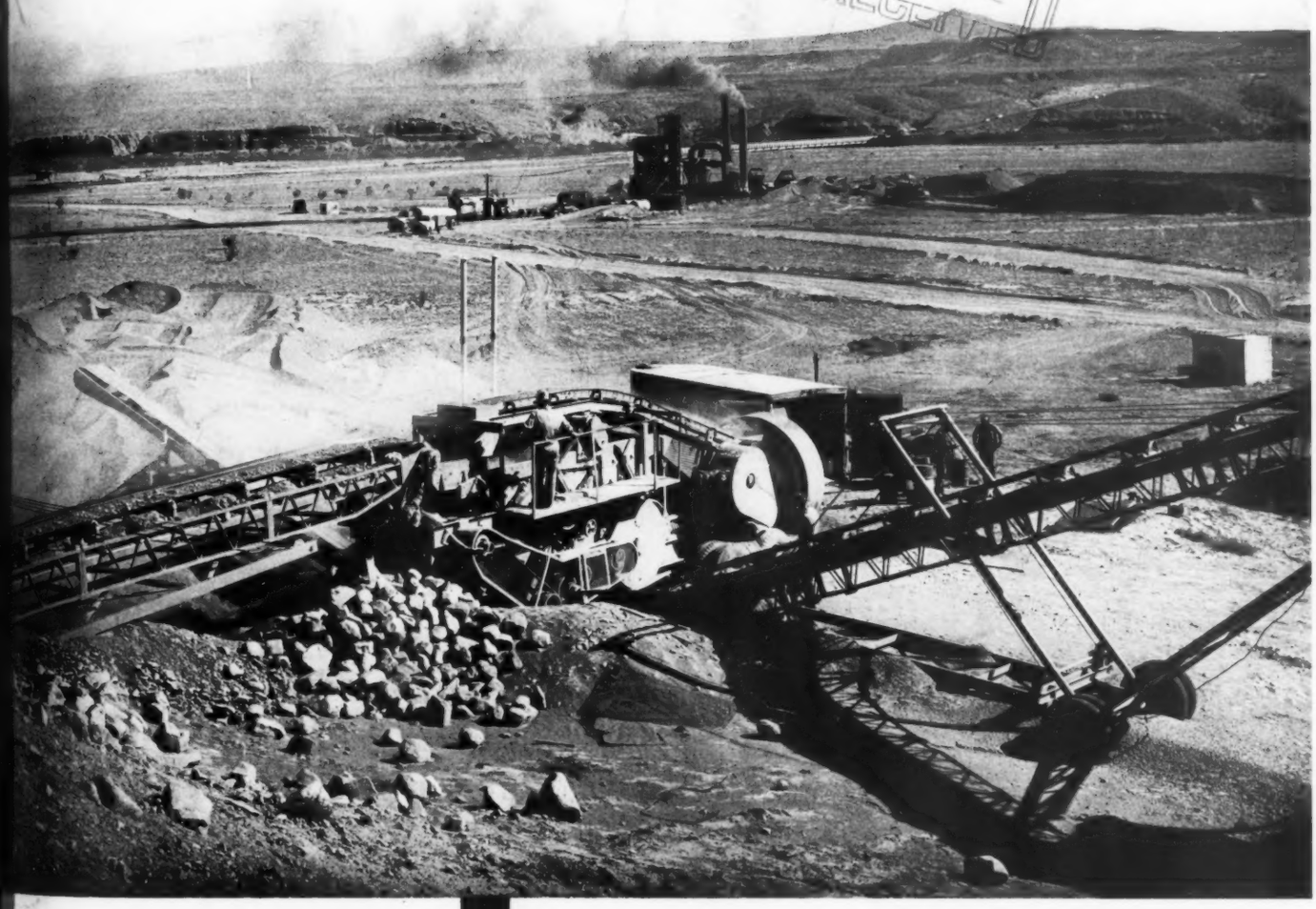

Road-building machinery against the vastness of New Mexico's rangeland. A Cedarapids Master Tandem portable crushing plant is in the foreground. Smoke pours out of a Standard SM asphalt plant in the background. These units supply material for reconstruction on U. S. 85 near Santa Fe. *Story on page 24.*

NEWS AND VIEWS

AISC Selects 1952's Most Beautiful Bridges – Story on Page 63

The AISC gave New York City's Harlem River Pedestrian Bridge top honors in the movable bridge class because "it is a quiet and welcome addition to our shoreline clutter."

"Chaste design of classic simplicity" gave the Bureau of Reclamation's Forebay Channel Bridge the first prize in the under 400-foot span and over $500,000 class.

The Massachusetts Dept. of Public Works garnered the top award for bridges under 400 feet costing less than $500,000. This is the Grove Street Overpass in Lexington, Mass.

For "sensitive expression of the suspension form of bridge construction" the Delaware Memorial Bridge was rated number one in this year's Aesthetic Bridge Competition.

Covering the Field

• Aerial Tramway
Ore field one side of a river, plant site the other. The answer was an aerial tramway. Story on page 71.

• Bridges
Precast box-type girders solved an overpass problem in California. Page 7.

And long continuous steel-plate girders are a feature of a bridge over the Willamette River in Oregon. See page 9.

Sheet-pile cofferdams were used for a New Jersey bridge—13 of them. Page 93.

Air tools helped a bridge contractor to rebuild piers and meet a high-water deadline in Ohio. Story on page 100.

• Buildings
Construction of a skyscraper in Dallas, Texas, was quicker and quieter than usual due to a new steel-frame design. Read about it on page 4.

For some wrinkles on types and applications of steel scaffolding turn to page 61.

A six-building rayon plant is going up in Mobile, Ala. Tilt-up wall construction is a feature. Read the story on page 103.

• Conventions
There's a calendar of forthcoming ones on page 75.

• Dam
The unpredictable Missouri posed some earthwork problems for the builders of Gavins Point Dam. Story on page 13.

• Distributor Doings
The distributors' department starts on page 87 with an article about two competitors who decided not to clash. Wheeler and Kershaw joined forces instead, and now they're going places.

Page 90 gives a report on the APWA show in Los Angeles. It drew big crowds.

• Dock
A fireproof wharf along the east bank of the Mississippi extends New Orleans' port facilities. Story and pix, page 40.

• Flood Control
The Mississippi is a river that has to be kept in check. Page 20 tells how the Army Engineers built an underpass closure.

• Highways
A sand-clay base course for road building around an H-bomb plant. Page 16.

Road-condition bulletins help public relations in Arizona. Page 42.

A Kansas highway addition meant some rugged rock grading. Story on page 50.

Venezuela spends $60,000,000 on a highway. Story in pix and words on page 64.

Soil-cement is used for a base course on an Arkansas street. See page 80.

• Law
Legal decisions in cases affecting contractors appear on page 76.

• News and Views
All views this month. Page 2 has pictures of the AISC prize-winning bridges.

• Paving
Hot-plant asphaltic pavement for a hilly New Mexico road. Story and pix, page 24.

Concrete paving in a Texas city meant traffic dodging for the contractor. Page 57.

Bituminous paving ends the isolation of a North Carolina barrier reef. Page 82.

• Portrait in Print
Paul C. Guinn is quite a character. Meet him on page 95.

• Railroads
A long grading job over difficult terrain needed rubber-tired rigs. Page 30.

• Safety
Costs and constants of safety engineering are discussed on page 92.

• Tunnel
A sewage tunnel burrows under a city's main street. Story on page 35.

• Welding
Hot radiography is a great time saver for weld inspection. See page 46.

Contractors and Engineers Monthly

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Heavy-duty Texaco Asphaltic Concrete paving in Virginia's new Norfolk-Portsmouth tunnel serves . . .

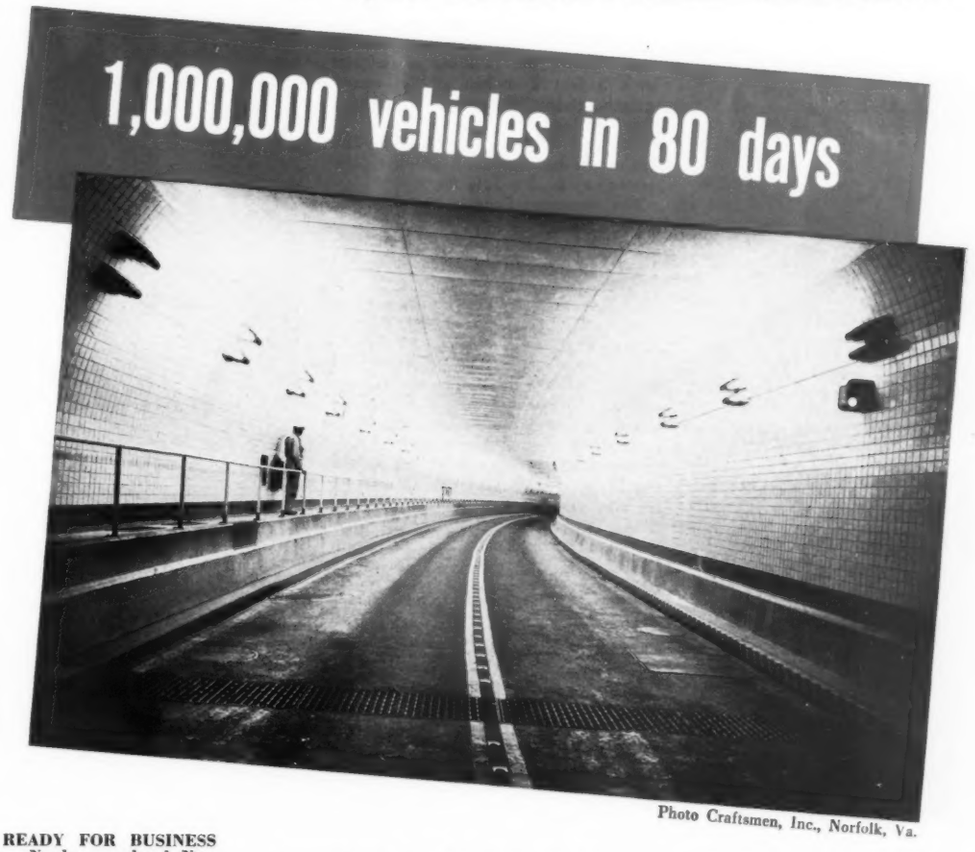

Photo Craftsmen, Inc., Norfolk, Va.

READY FOR BUSINESS — Newly completed Norfolk-Portsmouth Tunnel, which is served by a hot-mix Texaco Asphaltic Concrete pavement, laid by Ames and Webb, Norfolk.

Virginia's new Norfolk-Portsmouth vehicular tunnel under the Elizabeth River was opened officially on May 23rd this year. Preliminary estimates of the tunnel's traffic proved to be on the conservative side. By August 10th—80 days after the opening—1,000,000 vehicles had passed through the new facility.

The pavement which serves the exceptionally heavy traffic of the Norfolk-Portsmouth Tunnel is hot-mix Texaco Asphaltic Concrete. It was constructed in two courses, having a combined thickness of five inches in the center, tapering off to two inches at the sides. The 22-foot wide pavement is divided into two lanes by colored tile blocks, six inches square, which are embedded in the asphalt mix.

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TEXACO

TEXACO ASPHALT

Skyscraper Goes Up Quickly

Lightweight Cofar Panels Tacked to Welded Steel Frame Speed Erection and Eliminate Noise

• IT seemed strange to watch the erection of a modern 20-story office building and not hear the usual chattering staccato of riveting guns or at least the banging of carpenters' hammers on concrete forms. Sidewalk superintendents probably missed the pleasing din and roar that usually surrounds a project of this size, but it's certain that workers in nearby offices were grateful for the relative quiet. Both were undoubtedly surprised at the speed of the job—steel topped out in 81 calendar days!

The prime features of the project—speed and quiet—were the result of an

Dallas' new 20-story office building.

efficient functional design developed by Wyatt C. Hedrick, a Dallas, Texas, architectural and engineering firm. The design was evolved for the Fidelity Union Life Insurance Co., Dallas, Texas, owner of the new structure. It features a welded-steel frame with Cofar (combination form and reinforcing) panel floors. The relatively recent combination of these two structural units was the principal contributing factor in the speed of erection and the lack of noise.

Inge-Hayman Construction Co., Inc., Dallas, holds the general contract for the construction of the modern skyscraper. Located in the heart of the Dallas business district, the new structure will tower over most of the surrounding buildings. Its cost is estimated at about $5,000,000.

Details of Design

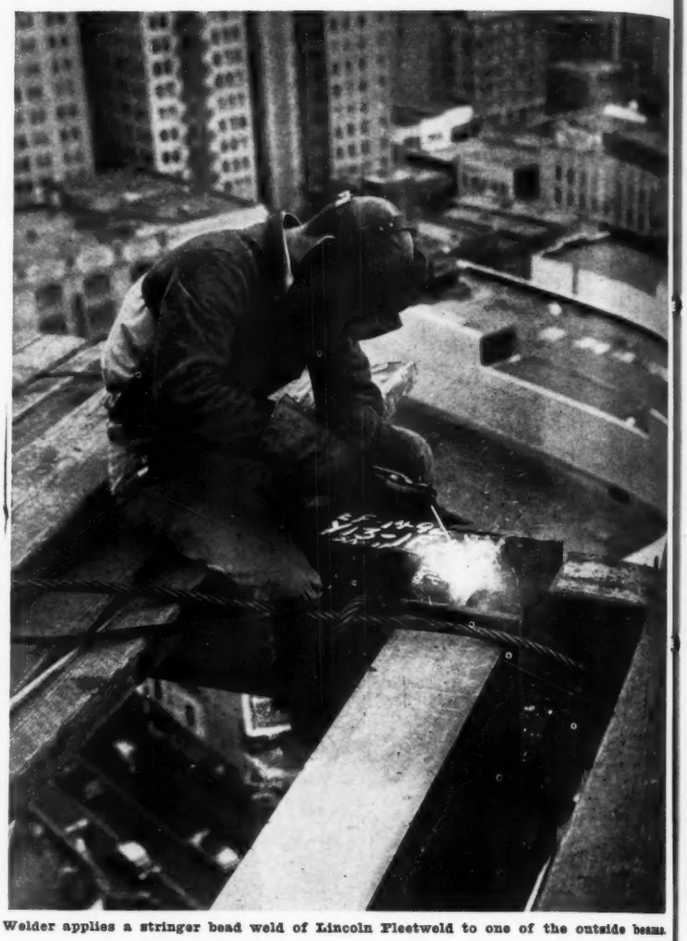
The new Fidelity Union Building is located on the northwest corner of Bryan and Bullington Streets. It's 100 feet wide and 153 feet 3½ inches deep. The front of the building is notched back 3 feet 2 inches at the center though, giving it a slightly irregular shape. There are 5 bays across the width and 6 through the depth. The size of the bays varies a bit—a typical center bay is 20 x 24½ feet.

The basement floor is 13 to 20 feet below the sloping street surface. Above this is the main floor, 16 feet 10 inches high. The 2nd to 19th floors are 11 feet 6⅝ inches high; the 20th is 12 feet 10⅝ inches; and the penthouse is 23 feet 2 inches. A 3-foot 8-inch parapet surrounds the roof deck.

The frame, as mentioned, is welded steel. The Cofar panels act as the form and the reinforcing for the 5-inch-deep lightweight-concrete floor slabs. Net clear floor area of the 20-story structure is 250,167 square feet. The building is faced with white brick backed by clay-tile blocks. The entire front face is Mansota stone block backed by hollow clay-tile blocks. The aluminum horizontal-sliding windows extend in long continuous sweeps across the east and north walls. There are no windows in the front and on the west side. Large plate-glass display windows on the first floor extend around to the front entrance though.

The first-floor finish is terrazo; the others are asphalt and rubber tile. Acoustical-tile hung ceilings are 8 feet 4½ inches above the floors. Surface-mounted fluorescent lighting will be used throughout. A Walker duct system embedded in the floor provides a 10 x 10-foot pattern of telephone and electric-current grids. Outlets occur 24 inches apart along the grid lines. A Carrier year-round air-conditioning system provides complete control of temperature and humidity inside the building at all times.

The project also includes a 280-car garage adjoining the office building. It is of reinforced-concrete design—two basements and five floors. The main floor will be used for car servicing; the basement, other floors, and the roof for parking. Special ramps provide the vehicle access between floors. A system of drives and ramps connects to the main building for the convenience of the tenants. Electric-eye traffic signals on all ramps and at the entrance insure complete traffic safety. All car movement is to be clockwise



Welder applies a stringer bead weld of Lincoln Fleetweld to one of the outside beams

C. & E. M. Photos

One of the last few loads of steel rises to the 20th floor . . .

where a workman turns guy derrick to set a load of beams onto the temporary decking of 3 x 12 timber.

and Quietly

and one-way only. A man lift and sliding pole enable the "car hops" to get up and down speedily and easily. Concrete stairs are also provided.

The garage has an open design—3-foot parapet walls on each floor and the roof—except for the fully enclosed offices and service area on the main floor. The office is air-conditioned; the basements ventilated only.

Excavation

Excavation work started July 20, 1951. The old building on the site had already been removed. Vilbig Bros., Inc., Dallas, subcontractor on the excavation, moved in with a couple of Northwests, each mounting ¾-yard dragline buckets. The hole was to be 100 x 150 x 20 feet. No problems were encountered in the digging except for the usual inconvenience of city traffic. About one-third of the excavation was rock. This was handled by one wagon drill and six hand drills. Three Schramm compressors, a 315 and two 210's, supplied the power. Hole size ran about 3 inches spaced 3 to 5 feet apart and 4 to 6 feet deep. The rock was blasted out with Gelamite. Delay caps controlled the break. Rock and dirt was loaded into 4-yard dump trucks and disposed of outside—of town.

Steel Erection

By February 1 the job was ready for steel erection. John F. Beasley Construction Co., Dallas, held the subcontract. All steel setting was handled by an American guy derrick. It was rated at 40,000 pounds at a 50-foot radius and 20,000 pounds at a 98-foot radius. The mast was 110 feet high; the boom 100 feet long. The derrick was controlled by a 4-drum American hoist (using only 2 drums), powered by a Cummins 150-hp diesel. Bethlehem supplied the steel for the Fidelity Union Building from its Beaumont, Texas, plant. It was shipped into Dallas by rail and then trucked over to the site. Beasley had a new White 200-hp-diesel tandem to handle the big loads. Members were chained down with Le Bus load binders, sometimes 6 to a truck when there were many small pieces.

Beasley set two floors at a time, then jumped two floors. The members on the derrick floor were given a stringer-bead weld in addition to the standard bolting—prior to follow-up by the welding crews. Total steel for the job ran to 2,850 tons. The large base columns were 14 WF 426's. Columns on the 20th floor were mostly 14 WF 53's. Beam and girder sizes ranged from 16 WF 80's on the lower floors to 16 WF 36's on the top floors. The crews set two floors a week. Beasley kept about 700 pieces of 3 x 12 decking, 24 feet long, on the working floor. The base of the derrick was supported by four 16 x 16 timbers and wedged 3 x 12's. Moving the decking, the welding machines, the steel, and the Cofar panels for two floors required about 300 separate lifts. Work moved along very rapidly though. Losing about 15 working days due to weather and other delays, they topped out April 21—81 calendar days after the starting date.

Eighteen welders worked right behind the steel setting. Most of the rod, 12½ tons in all, was Lincoln Fleetweld 60-10. The welding machines were all 300-amp Lincoln units.

Workmen set the Cofar panels only a few floors behind the steel erection. The average floor bay was about 24 x 20 feet. The main beams tied into the columns. A single secondary beam in each bay centered across the long dimension, leaving about 10 feet to be bridged by the Cofar panels. Each of the panels was about 32 inches wide. Granco Steel Products Co., Granite City, Ill., designer and manufacturer of Cofar, had cut the panels to fit the building frame, including corner cuts at columns, and bundled them for the individual bays prior to shipping. That cut down job time appreciably. The panels were placed across the beams, shored up at their centers, and tack-welded to the beams through washers 10 inches on centers.

As soon as the Cofar was in place the mechanical trades moved in. The sturdy corrugated panels were of ample strength to support the workmen and the equipment.

With the underfloor raceways, ducts, and plumbing in place, the contractor set temporary supports and runways for concrete power buggies.

(Concluded on next page)

C. & E. M. Photo

Steel workers bolt a newly placed beam. Stacked wood planking on the right will be used later to provide a temporary working area.

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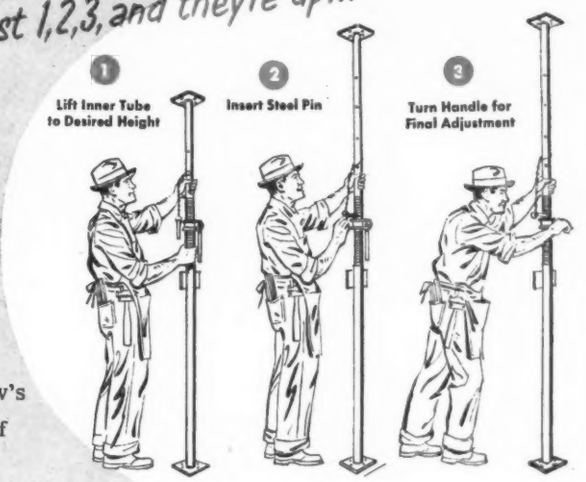

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Skyscraper Goes Up Quickly and Quietly

(Continued from preceding page)

Concrete Operations

Mobley & Speed Co., Dallas, subbed the concrete work. There was no reinforcing to be set. The 24-gage deep-corrugated Cofar panels with ¼-inch T-wires welded across the corrugations provided the necessary resistance to bending moments. The spex called for a lightweight concrete for the floor slabs—about 80 pounds per cubic foot. The design compressive strength was 2,500 psi, but test on field batches showed the mix to develop a strength above 3,000. This was obtained with a batch containing 6 sacks of portland Type 1 cement per yard. Using 6½ gallons of water per sack, the contractor obtained the desired 5-inch slump. One pound of Pozzolith was also added for each sack of cement. The expended shale aggregate was supplied by Texas Lightweight Aggregate Co., Dallas.

The concrete was transit-mixed; supplied by Dallas Concrete Co. Truck mixers rolled right up to a twin 240-foot Archer material tower and loaded into a 1¼-yard trip bucket. Gar-Bro powered carts carried the concrete over to the pours. The concrete was given a wood-float and steel-trowel finish—no vibration. The contractor experienced no problems at all mixing or placing the lightweight batch, though sometimes it didn't set for about 36 hours.

Below the concreting operation workmen wrapped the steel columns and beams with a wire mesh and applied a 2-inch covering of lightweight plaster for fireproofing. At the same time, bricklayers swarmed over the walls keeping the brick facing moving up behind the steel. Scaffolds, hung from a hundred or more Patent scaffold hoists, surrounded the building. Two Essick 3-bag mixers insured a ready supply of mortar on all the boards. By the end of this year the job will be completed and tenants will move into the Texas skyscraper.

Personnel

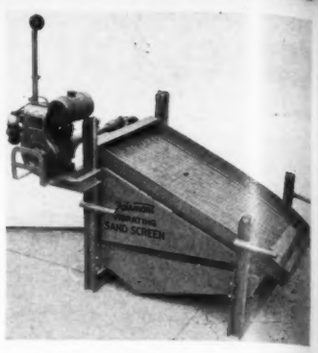
T. J. Hayman has directly supervised the construction of the Fidelity Union Building. R. C. Harwell headed up the steel erection crews; Charles Vilbig, the excavation work; and Bert Speed, the concrete operations.

A Vibrating Screen

A new self-contained vibrating sand screen is announced by Fairmont Railway Motors, Inc., Fairmont, Minn. High-frequency vibration is combined with a heavy-duty screen having a large percentage of open area.

The vibrating element is attached to the upper end of the screen frame, and consists of an integral eccentric shaft turning on two taper roller bearings and enclosed in a housing. A single-cylinder air-cooled engine, governed at 3,000 rpm, drives the vibrating element through a flexible shaft.

Four hanger arms support the screen and have a rubber bushing at each end to give ample freedom to the screen assembly. The complete unit weighs 380 pounds and has a structural-steel frame and steel side sheets and sand hopper. A lift handle is located at each corner, and an opening at the lower end of the screen frame permits the rejected material to fall to the ground.



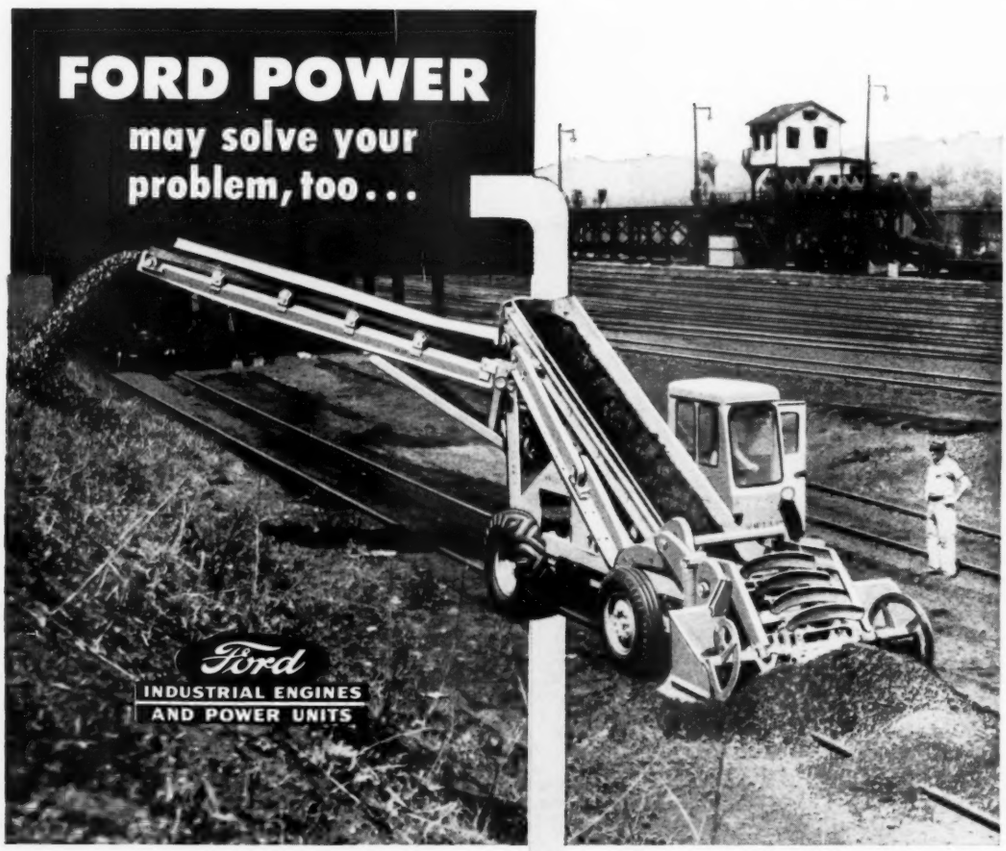
Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 870.

Delaware River Extension Of Pennsylvania Turnpike

The motoring public may have 360 miles of four-lane divided highway without traffic lights or intersections—from the Delaware River to the Ohio state line—sooner than it expected. One obstacle was overcome in September when investment bankers financed the Delaware River Extension of the Pennsylvania Turnpike System by purchasing $65,000,000 tax-exempt revenue bonds.

The extension will be a 33-mile link from the eastern terminus of the Turnpike at King of Prussia to a point on the Delaware River, just south of Edgely. It will run through Montgomery and Bucks Counties, by-pass Philadelphia to the north, and cross the Schuylkill River, southeast of Norristown.

The next step after that will be a bridge at Edgely, built either by the joint efforts of the Pennsylvania Turnpike Commission and the New Jersey Turnpike Authority, or by one of them. This bridge will connect with the proposed extension of the New Jersey Turnpike. When the Ohio and New Jersey Turnpikes meet, it will mean a 650-mile, non-stop route from the Hudson River to the cornfields of Indiana.



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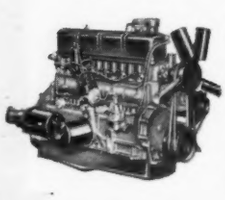

Here's the heavy-duty power plant specified by Athey Products Corp., Chicago, Ill., to operate their Force-Feed Hi-Loader used by railroads for track clean-up work as pictured above. Other Athey Force-Feed Loaders popular with road contractors, state and county highway departments are powered by the same dependable Ford Engines.

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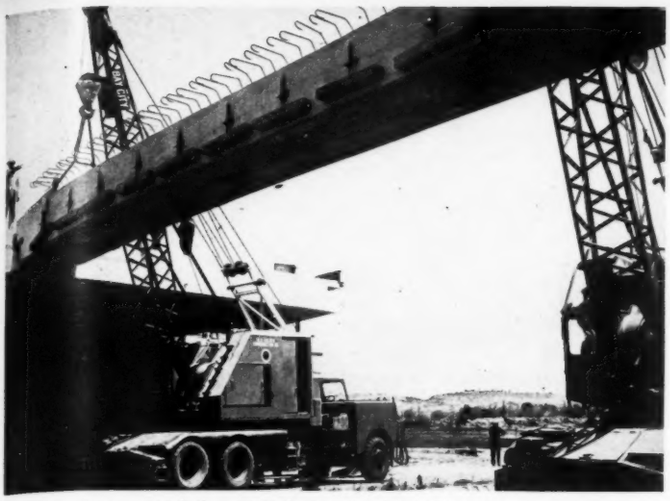

Two Bay City cranes inch a precast concrete girder into place on preconstructed supporting structures for the new Camino del Rio overpass in San Diego, Calif.

Precast Girders For Overpass Span

When Joseph Kershaw, Senior Structural Engineer in the San Diego City Engineer's office, undertook the construction of the new Camino del Rio overpass spanning Mission Valley Road in San Diego, Calif., he faced four major problems: 1. Traffic on the heavily traveled link between East San Diego and beach areas could not be interrupted during the construction. 2. There was not enough room on either side of the highway for the necessary form structures, scaffolding, and work space without prolonged interruption of traffic. 3. There could be no middle-of-the-highway support of the overpass. 4. Distance between grades had to be held to a minimum.

Mr. Kershaw came up with the right answer. It was a cantilever-type construction in which reinforced-concrete hollow-box-type girders would be precast on the ground and then swung into place on preconstructed supporting structures on either side of the highway. He designed the girders, M. H. Golden Construction Co., the San Diego contractor, made them, and the plan worked. Traffic continued to use the road during the entire construction, and was detoured for less than 15 hours on three different days.

Each of the 14 girders is 56 feet long, 6 feet wide, and weighs 38 tons. The overpass has an overall length of 93 feet 6 inches, with a deck 85 feet 6 inches wide. The structure rests on 70-foot-long concrete piling, and each abutment has 92 piles. The abutments were designed with partial eccentric cantilevers of 13-foot extensions to hinges, or steps, on which each girder could rest. Two Bay City mobile cranes swung the girders into place.

Of special interest was the "C"-shaped type of concrete abutment supporting the precast-concrete suspended span. This reduced the length of the span, which in turn reduced its depth and weight. The former permitted a lower grade line and the latter facilitated lifting it into place over traffic.

The overpass, part of a project that includes a new bridge over the San Diego River and a traffic cloverleaf, is expected to eliminate 90 per cent or more of the congestion that now takes place at the intersection of Mission Valley Road and Morena Boulevard.

New Fastening Gun

A new hand-type automatic fastening gun for installing cables and hollow-tube lines, has been developed by the Heller Stapler Co., 2135-E Superior Ave., Cleveland, Ohio.

It may be operated with one hand, leaving the other hand free to guide the lines being installed. It is said to drive bands around cables and tubes into hard or soft woods, plaster walls, flooring, joists, mortar joints, and cinder or mineralite building blocks. The new gun drives a special extra-size band with leg lengths varying from 3/16 to 1/2 inch.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 914.

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Sand Spreader for Seal Control and Ice Control

Check these features:
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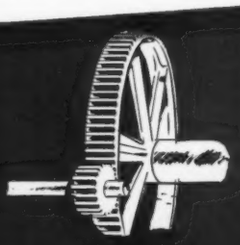
AMSCO TOOLFACE for metal to metal wear up to 1000° F. Deposits have high abrasion and impact resistance. All diameters bare and coated. Microstructure: martensitic steel.

AMSCO TUBE TUNGSITE (coarse particles) is best suited for applications requiring highly efficient cutting qualities, for hardfacing earth working and drilling equipment used for cutting extremely hard compositions, for hardfacing applications requiring a serrated edge and hard-facing certain types of earth working equipment or parts subject to extreme abrasion.



AMSCO HF-60 for moderate impact and abrasion and has outstanding weldability particularly for vertical applications. All diameters, coated only. Microstructure: martensitic steel.

AMSCO FARMFACE or AMSCO CHROMEFACE for farm or industrial use. Excellent resistance to low stress sliding abrasion. All diameters, bare and coated. Microstructure: a high chromium austentitic iron containing manganese and silicon, and consisting of hard chromium carbides in a matrix of austentite.

AMSCO No. 217 for abrasive service up to 1000 F. All diameters, bare and coated. Microstructure: an air hardening martensitic iron alloy containing chromium and tungsten.

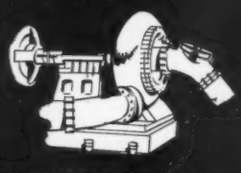
AMSCO HF-40 for severe abrasion, moderate impact. Deposits have excellent weldability. All diameters, coated only. Microstructure: martensitic cast iron.

AMSCO AIR-HARDENING for abrasion and severe impact. Deposit can be forged to sharp edge without loss of hardness. All diameters, bare and coated. Microstructure: martensitic steel.

AMSCO AW-79 will meet most requirements for better control of wear where abrasion and impact are important factors—plus all the advantages of automatic welding. Especially suitable for rebuilding and hardfacing tractor rollers, steel wheels, sheeting rolls, dredge pins, as well as dozens of other automatic applications. 3/32" and 1/8" in 22 1/2" ID., 100 lb. coils.

AMSCO V-MANG, bare or coated, for build up and repair on manganese steel castings exposed to impact; work hardens—1/8", 5/32", 3/16", 1/4". Microstructure: austenitic manganese steel.

AMSCO CO-MANG, coated only, for build up and repair of manganese steel castings exposed to severe impact. Deposit has excellent impact resistance; work hardens—1/8", 5/32", 3/16", 1/4". Microstructure: austenitic manganese steel.



AMSCO TUNGROD (fine particles) is best suited for applications requiring highly efficient cutting qualities, for hardfacing earth working and drilling equipment used for cutting extremely hard surfaces or formations, for hardfacing applications requiring a thin edge or small point, for hardfacing certain types of equipment or parts subject to extreme abrasion.

AMSCO ECONOMY HARDFACE "C" for abrasion resistant service and severe impact. All diameters, coated only. Microstructure: martensitic steel.

AMSCO No. 1 and AMSCO No. 6 for combination of corrosion and abrasion or for 1000 F. service and above. No. 1 has greater abrasion resistance; No. 6 is tougher and can be machined. All diameters, bare and coated. Microstructures: No. 6 contains an eutectic carbide mixture in a solid solution matrix, while No. 1 contains large hard wear-resistant chromium carbide crystals scattered through a solid solution matrix.

AMSCO No. 459 for severe abrasion, mild impact. Excellent abrasion resistance. All diameters, bare and coated. Microstructure: martensitic cast iron containing chromium and molydenum, consisting of hard carbides, austentite and martensite.

To get the right answer, detailed analyses, and other pertinent information, concerning your wear problem, write for catalog 650W or contact your nearest Amsco Distributor.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
395 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

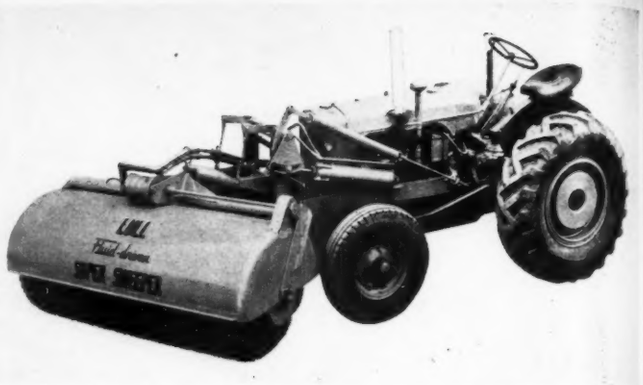
Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que.
Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

Centrifugal-Pump Bulletin

A bulletin covering its general-purpose cradle-mounted centrifugal pumps has been released by Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. It covers 5 basic cradle groups and 17 corresponding pump types, their capacities, horsepower ratings, and uses. It gives pump dimensions and a table of performance under 60-cycle use.

The bulletin describes special-purpose units and includes design modifications.

This literature may be obtained from the company by requesting Form 7223, or by using the Request Card at page 18. Circle No. 898.



An automatic spring-load float device is now available for the Lull Super and Standard sweepers to compensate for uneven ground.

Device Compensates For Uneven Ground

A spring-loaded float device that automatically compensates for uneven ground and maintains a constant broom-ground contact pressure at all times is now available for Lull's Super and Standard sweepers. The automatic compensator is said to provide more uniform and faster sweeping.

Other features of the sweepers include finger-tip power hydraulic control for regulating broom angle, rotation, speed, and height. All broom settings can be changed without stopping tractor, and without leaving the tractor seat. Units are made in 5, 6, and 7-foot sizes.

Further information may be secured from Lull Mfg. Co., 370 W. 90th St., Minneapolis 30, Minn. Or use the Request Card at page 18. Circle No. 950.

Popular Flood-Control Movie

"Shackles for the Giant" is a 25-minute color and sound film produced by the Mississippi River Commission. It dramatically portrays the destruction caused by floods in the lower Mississippi River valley before 1928 when the flood-control plan was inaugurated. Development and details of the present plan are shown by live photography and animated drawings.

Since its release last year, the film has been seen by almost 8 million members of civic clubs, school groups, technical groups, and industrial-training organizations. A number of universities include it as a part of their course in flood-control practices, and it has appeared on television.

Copies may be obtained from the President, Mississippi River Commission, P. O. Box 80, Vicksburg, Miss.

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Peerless
SNATCH BLOCK
Gives you more work power for large or small jobs.
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Long Plate Girders To Span Willamette

American Bridge Division's Combination Derricks Handle The Longest Girders West of the Mississippi

By RAY DAY

• CONTINUOUS steel-plate girders, 252 feet long, 10 feet deep, and weighing up to 68 tons per lift, are the unusual and spectacular feature of the new Marion Street Bridge across the Willamette River in Salem, Oreg. The girders are the longest of their type ever installed west of the Mississippi River, and were designed to reduce cofferdam and pier work in the deep stream. The 647-ton erection job was handled under a $249,000 contract with the Oregon State Highway Commission by the American Bridge Division of the U. S. Steel Corp., Pittsburgh, Pa.

An unusual combination—a stationary stiffleg derrick mounted on a traveling frame atop the structure and a floating derrick down on the river—hoisted the ponderous members up to position. The lifts were divided according to the capacities of the derricks, so that the floating derrick handled only about ⅓ the total weight of a girder. Rigging and the whole operation was so smoothly arranged that the heaviest lifts were made in about 8 minutes.

Bridge Design and Purpose

Eventually, the Marion Street Bridge will serve as the westbound trafficway for a fast divided expressway crossing the river near mid-Salem. The river at this point is now bridged by a fairly modern structure which carries two lanes of traffic. After the new Marion Street Bridge is finished and traffic from the old bridge can be routed over its deck, the old bridge will receive some necessary alterations so that its approaches and deck will fit into the future expressway flow. It will then carry eastbound traffic, and the two vehicle streams will be separated as they cross the river and pass through Oregon's capital city.

The new Marion Street structure is a clean, symmetrical, and graceful piece of design, consisting of reinforced-concrete piers, a structural-steel girder framework over the Willamette River, and a reinforced-concrete deck, 26 feet wide curb to curb. The approaches consist of reinforced-concrete construction and blend well into the river portion of the bridge. The structure is designed for H20-S-16-44 loading.

Structural steel on all of the spans over the river consists of one main girder on each side, with cross frames and bracing between, along with the necessary structural-steel framework to carry the 5-foot pedestrian walkway on the north side. There are four spans—one 96-foot span, two 210-foot spans, and the extra-long 252-foot center span.

Included also in American Bridge's contract, along with furnishing and installing the structural steel, was the installation of two pipelines furnished by other sources. One is a 20-inch sewer line with Dresser couplings; the other, a 24-inch steel water line with welded joints. Both were installed in the structural framework between the girders.

The Oregon State Highway Commission contracted the bridge's construction in three main parts. The other two principal contracts consisted of pier

(*Continued on next page*)

The concrete piers of the Marion Street Bridge project in Salem, Oreg., are in place, and a riveting crew assembles the big girders. Note those already in place, the falsework, the base of the traveler above, and the floating derrick at right.

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Long Plate Girders To Span Willamette

(Continued from preceding page)

construction in the river and a cofferdam job which was done by Lee Hoffman Construction Co. The contract for construction of the bridge approaches, deck, and appurtenances is still active, and is being done by General Construction Co.

The bridge approaches are on a curve, and the main deck is cambered and sloped, but generally speaking, it is a high-clearance structure. Typical pier footings are at elevation 76.0; the river bed is at 80; low-water level is 109.6; maximum high water ever recorded hit 145.0; and the curb elevation of the finished structure will be 190.08. Concrete in the piers is 3,300-pound material, while the compressive strength of all other concrete is 3,500 pounds after 28 days.

Heavy Handling

The massive girders were fabricated in Gary, Ind., and shipped by rail to the project after almost a year's delay because of the conservation of critical materials for the Korean emergency. Unloaded, they were trucked on special low-bed trailers to the job site, which is not far from the city center of Salem. At the project, they were handled by a Manitowoc 3000 crawler crane, which erected the first 96-foot span at the east shore, and then turned around and erected the stiffleg derrick on the steel. The Manitowoc also handled the loading of girder sections to a barge.

In addition to this crane, there was a stiffleg derrick "traveler" set up on top of the bridge. It was a powerful rig, capable of lifting 60 tons. It had a 90-foot boom, 20 feet of jib, and a Clyde hoist driven by a Caterpillar diesel engine with torque converter. In addition, it was tied down at each corner to develop the proper stability when making its heavy lifts.

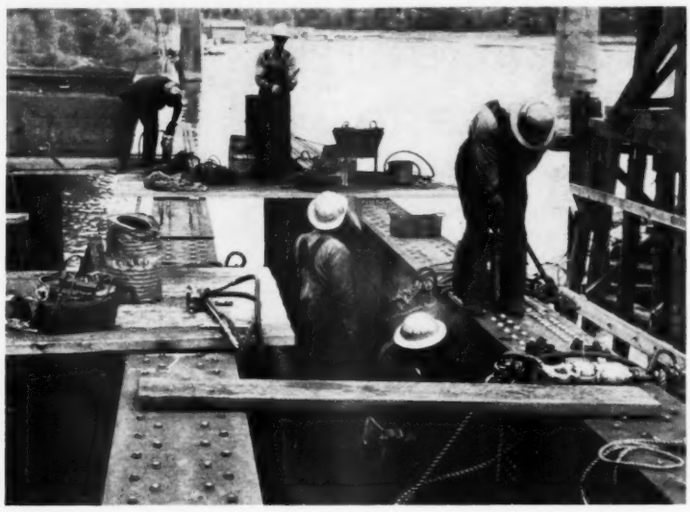
The floating rig was mounted on a 104 x 29-foot steel barge, and consisted of a 90-foot boom, a stiffleg arrangement, a 210-cfm air compressor, a Lidgerwood main hoist driven by a Le Roi engine, and Skagit and Clyde deck hoists, also engine-powered.

Each rig had specific functions. The Manitowoc crawler, in addition to the work already mentioned, did a dragline dredging job on the west side of the river, deepening the water about 5 feet on the shore side of pier 4, so that the floating derrick could get in for its lift. This machine, located on the west bank, also drove one bent of the necessary falsework.

The main stiffleg derrick picked up the heaviest part of the main lifts and hoisted smaller pieces of the structure to position.

The floating derrick, or Ginnywink, as it is called by crewmen, helped to make the heavy girder lifts and drove the wood piles which formed the base upon which the falsework was erected.

J. H. Turnipseed (left), General Superintendent for American Bridge, confers with Frank Steadman, Structural Foreman on the day shift.



Here is a closeup of the riveting crew, air driving and bucking the rivets. The blacksmith (background) has just heated and thrown a rivet to the man below.

Falsework Construction

Special falsework construction, consisting of piles, caps, a timber superstructure, and steel H-beams, provided a landing place for one end of the girder section until the other section could be brought up. The continuous-span girders were made up in several sections, four per span, and these, in turn, were assembled on the barge. They were riveted into dual sections, so the continuous spans could be formed with only two sections—one from pier to falsework bent and one from falsework bent to next pier.

The base of the falsework was a divided 26-pile cluster, driven into the riverbed to solid bearing. These piles were then capped by 12 x 12 fir timbers, doubled. A dozen 12 x 12 fir legs rose in the air off these caps to carry further caps and the steel members upon which the girder end was landed. All main connections in the falsework structure were bolted and tied by metal straps, and the legs were heavily sway-braced to carry the girder ends with

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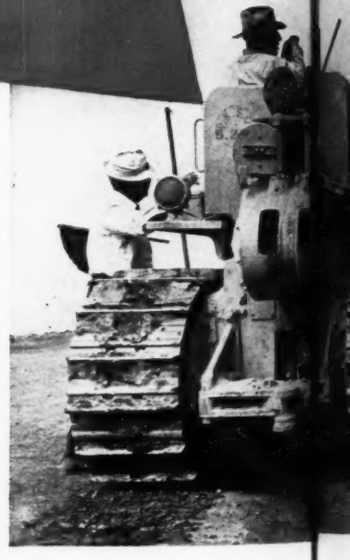

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TUNE IN: Tuesday nights on television — the TEXACO STAR THEATER starring MILTON BERLE. See newspaper for time and station.

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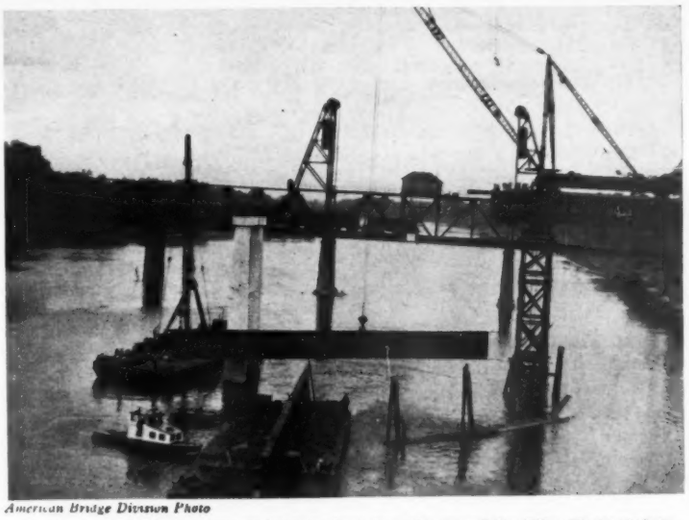
ease.

The falsework structures had to be accurately located so that the position of the girder end would be true both for line and grade. An unusual feature was the fact that the anchor bolts were not set in any of the piers when the piers were built. They were located by direct measurement when the first dual section of the girder in each span was in place, and installed by drilling the necessary holes with a jackhammer. After the anchor bolts were in, the girder was completed and riveted. At that point the anchor bolts were set solidly in poured babbitt.

Making the Lifts

With such adequate rigging, the actual lift of a heavy girder looked easy. When the barge gang finished assembling the section to go up, the two cranes were positioned in place. The traveler on top of the bridge was tied down tight on all four corners, and the floating rig was anchored and tied in the 5-mile-per-hour Willamette River. One 9-part ¾-inch wire-rope line was lowered from the main-boom sheave of the traveler, and another was used on the floating rig.



American Bridge Division Photo

Floating and stationary cranes team up here to make one of the lifts. These girders, the longest west of the Mississippi, reduced cofferdam and pier work.

Cable slings, which always have a sharp angle around a girder, were not used. Instead, a special erection hitch was bolted to the girder flange at the point where the two derricks would hook on, and the main-load shackle was attached to an eye in this plate. The 60-ton-capacity traveler handled about ⅔ of the total weight of one of the girders by hooking on some distance from the end. The floating Ginnywink hooked on almost at the end of a girder to lift its part of the total load.

One man gave the signals from the time a girder left the barge until it landed on the piers and wooden falsework. The lifts were made at a slow and steady pace, and so efficiently that they appeared easy. When a lift was all over and the traveler was ready to move ahead to a new setup over the completed span, a double set of 5-part blocks was used to slide the A. B. traveler ahead.

The American Bridge gang, from the General Superintendent down to the ironworkers, represented many years of experience. J. H. Turnipseed, General Superintendent, was a foreman on the Golden Gate Bridge at San Francisco, and has built many structures in New York, Massachusetts, and New England. Slender, tough, and wiry, at an age when some men think of retiring he believes that a man who keeps himself in good health, physically and mentally, is a safe man on the job. When a crew member showed up for work who looked worried, angry, or as if he had overindulged in food or drink too close to shift time, he was watched very carefully.

Started April 20, 1951, American Bridge's contract did not get under way until May, 1952. But last summer the steel was all in place and General Construction Co. had begun the deck and sidewalk work.

Personnel

In addition to General Superintendent Turnipseed, American Bridge was represented by Field Engineer Don Englehorn and by Steel Foremen Al Irby, Frank Steadman, and Herb Skinner. Field work was under the direction of E. E. McKeen, Erecting Manager, American Bridge Division, U. S. Steel Corp., with offices in San Francisco. L. L. Jensen is the Resident Engineer for the Oregon State Highway Commission.

The new bridge was designed under the supervision of G. S. Paxson, Bridge Engineer for the State, with State Highway Engineer R. H. Baldock in over-all charge of the project.

NCA Elects Safety Chairman

W. H. Kelly, Jr., Assistant to the General Construction Superintendent of The Lummus Co., New York, N. Y., has been elected Chairman of the Safety Committee of the National Constructors Association. He will complete the unexpired term of F. R. Griffin of Koppers Co., Pittsburgh, Pa. The Association is an organization composed of leading firms engaged on a national basis in the design and construction of chemical plants, petroleum refineries, and steel mills.

Cleaver-Brooks' Trade-Mark

Prometheus, according to Greek mythology, was a god who came down from heaven and bestowed the gift of fire, and the arts which control it, on the world for the everlasting benefit of mankind. Cleaver-Brooks Co., Milwaukee, Wis., builder of equipment for the generation and utilization of heat, has borrowed this idea for its new trademark. This depicts a hand holding the Promethean Flame, symbolizing the firm's production.

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Adds Rust Inhibitor To De-Icing Chemical

Addition of a new phosphate-type rust inhibitor to Ice Rem ice and snow-melting chemical pellets is announced by Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio. Known as Speconite, the new inhibitor is said to safeguard against excessive rust in the de-icing of metal pipes, drains, downspouts, metal loading ramps, and curbs. When used on drives and streets, it also retards rusting on automobiles and other vehicles.

Ice Rem is reputed to have 30 times the thawing capacity of salt and is used to furnish quick traction for automobiles on ice-covered surfaces. According to the manufacturer, a light sprinkling spreads itself quickly to melt ice and snow, and remains to melt subsequent snows until its exothermic action is completely exhausted. The product is stated to be harmless to vegetation, rubber, asphalt, or paved surfaces.

Ice Rem is available in 10-pound cans, 25-pound pails, and 100-pound drums. Ton lots are shipped in waterproof 100-pound bags.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 886.

Loading Ramp Unit

A hydraulically-operated portable loading ramp that can be adjusted to any truck-bed height is introduced by

John B. Illo Engineering Co., 2414 E. 57th St., Los Angeles 58, Calif.

Available with manual or electrical power, the ramp has a deck travel of 24 inches. Forklifts can be driven right onto trucks over the diamond-floor-plated deck. An adjustable throw plate can be raised or lowered for installation inside buildings without interfering with doors. It can be locked in a horizontal position during loading to prevent accidental moving.

The power unit assembly consists of a 110-volt, single-phase ½-hp motor directly connected to a ⅜-inch standard Viking 350-pound-pressure hydraulic pump. The ramp is counterbalanced by heavy-duty tension-type coil springs to eliminate additional load on truck beds. It has a capacity of 20,000 pounds.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 859.

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NEVADA—The Euclid Road Machinery Co., Emeryville; Monrovia, California.
Fouger Equipment Co., Salt Lake City 8, Utah.

NEW HAMPSHIRE—Clark-Wilcox Co., Boston 34, Mass.

NEW JERSEY—L. B. Smith, Inc., Camp Hill, Penna.
Hubbard & Floyd, Inc., New York 53, N. Y.

NEW MEXICO—Lively Equipment Co., 3801 No. Fourth St., Albuquerque.

NEW YORK—Hubbard & Floyd, Inc., 151st St. & Grand Ave., New York 53.
T. E. Potts Equipment Co., 2260 Sheridan Dr., Buffalo.
L. B. Smith, Inc., 357 W. Fayette St., Syracuse 2; 134 State St., Albany.

NORTH CAROLINA—Hampton Roads Tractor & Equipment Co., Norfolk, Virginia.
North Carolina Equipment Co., P. O. Box 880, Greenville; P. O. Box 1205, Charlotte; Swayne Creek Rd., Asheville; P. O. Box 128, Guilford; P. O. Box 655, Wilmington.

NORTH DAKOTA—The Euclid Road Machinery Co., Hibbing, Minnesota.

OHIO—The W. W. Williams Co., 838 Goodale Blvd., Columbus 8; 18301 Brookpark Rd., Cleveland 11; 914 Main St., Cincinnati 2; 1260 Cornell St., Toledo (Maumee).

OKLAHOMA—Butler-Sparks Equipment Company, Oklahoma City and Tulsa.

OREGON—Intermountain Equipment Co., Boise, Idaho.
P. L. Crooks & Co., 2145 N.W. Pettygrove St., Portland.

PENNSYLVANIA—Atlas Equipment Corp., 635 Sloan Ave., Pittsburgh 12.
Standard Equipment Co., 152 Norton St., Wilkes-Barre; Hepburn & Lycoming Sts., Williamsport.
L. B. Smith, Inc., Camp Hill (Harrisburg); 29th & Montgomery Avenue, Philadelphia.

RHODE ISLAND—Clark-Wilcox Co., Boston 34, Mass.

SOUTH CAROLINA—Southern Equipment Sales Co., Sumter Highway, Columbia.

SOUTH DAKOTA—The Euclid Road Machinery Co., Hibbing, Minnesota.

TENNESSEE—Euclid-Memphis Sales, Inc., 128 S. Butler Ave., Memphis 2.
Power Equipment Co., 1218 Island Home Ave., Knoxville; 800 W. Manning St., Chattanooga.

TEXAS—The Euclid Road Machinery Co., 1007 Levee St., Dallas 2.
Lively Equipment Co., Albuquerque, New Mexico.

UTAH—Fouger Equipment Co., 1361 So. 2nd West, Salt Lake City 8.

VERMONT—Clark-Wilcox Co., Boston 34, Mass.

VIRGINIA—Hampton Roads Tractor & Equipment Co., W. 39th and Killam Ave., Norfolk.
Rish Equipment Co., 1601 Chamberlayne Ave., Richmond 16; 405 Center Ave. N.W., Roanoke 7.

WASHINGTON—Philpott Equipment Co., 573 Dexter Horton Building, Seattle 4, Washington.
P. L. Crooks & Co., Portland, Oregon.
Intermountain Equipment Co., E. 611 Sprague Ave., Spokane 9.

WEST VIRGINIA—Atlas Equipment Corp., Pittsburgh.
Rish Equipment Co., Kanawha Blvd., Charleston 22; East on U.S. 50, Clarksburg; P.O. Box 209, Bluefield.
L. B. Smith, Inc., Philadelphia, Penna.

WISCONSIN—Cunningham-Ortmayer Company, Inc., Wausau 48, Eau Claire and Green Bay.

WYOMING—Constructors Equipment Co., Denver 5.
Fouger Equipment Co., Salt Lake City 8, Utah.

Earthwork Problems On Gavins Point Dam

Stage 1, Consisting of 1,000,000 Cubic Yards of Earth Excavation, Impeded by Shifting Missouri

By L. H. HOUCK

• THE changing nature of the Missouri River with its unpredictable shifts of channel which plagued the Indians and threw carrier pigeons and cranes off their ancient courses, has reasserted itself in this modern world to harass engineers and contractors, and recently managed to upset the man-made plans for Gavins Point Dam.

Up to its old tricks, the wily Missouri flooded the dam site, loaded the silt beds with nearly unextractable water, and changed its channel to the other side of a midstream island before the contractor could move in. As one old river man put it: "LaSalle thought the Missouri was a new route west to the Pacific." Then he spat reflectively, "An' judgin' by past performance she might make it yet."

Gavins Point Dam is the newest main-stem project of the Corps of Engineers in its Missouri River program for flood control and hydroelectric power. Planned originally as a low dam, its height has been increased so much that now it will perform a key function in power production and re-regulation of upstream releases. Located four miles west of Yankton, S. Dak., the dam has the north abutment in Yankton County and the south abutment in Cedar County, Nebr. It is 76 miles downstream from Fort Randall Dam and 846 miles above the mouth of the Missouri.

Contract for Stage 1 earthwork, consisting of one million yards of earth excavation and one million yards of rock, was let to List & Clark Construction Co., Kansas City, Mo., in April, 1952, with completion scheduled for this month. List & Clark moved their equipment in during June, 1952, and had to use bulldozers, and cranes working from mats, in order to clear the site because of the marshy condition of the river bank, still wet from the spring flood.

Gavins Point will be a rolled-earth fill and chalk embankment 8,700 feet long, 74 feet high, and 35 feet wide at the crest, and will contain more than 7,000,000 cubic yards of fill. Total cost is estimated at $60,055,000.

When full the reservoir, with a surface area of 33,000 acres and a total storage capacity of 540,000 acre-feet, will extend 37 miles to the vicinity of Niobrara, Nebr. Maximum depth will be more than 40 feet and trees and brush in this sparsely settled reservoir area will be removed before water storage begins. There is a flood-control storage capacity of 165,000 acre-feet based on the coordinated operation of all main-stem dams, which will provide a substantial reduction in flood flows in the river below Gavins Point. Most of the sediment now passing the dam site will be trapped in the large upstream reservoirs. A minor amount will be contributed by the Niobrara River which is not considered a heavy-sediment producing stream.

Power and Cost Aspects

Power to be installed will amount to 100,000 kw which will supply expected loads in this vicinity. The annual production of energy will average 617,000,000 kilowatt hours and will make it possible to disperse defense establish-

(Continued on next page)

Corps of Engineers Photo

Looking north from the right bank of the Missouri, this is a general aerial view of the closure-area operations for Gavins Point Dam.

Lima Type 2400, equipped with 120 ft. boom, and 6 cu. yd. bucket.

FOR
OPEN PIT MINING, QUARRIES and
HEAVY CONSTRUCTION

The LIMA Type 2400 is a big, full mechanical clutch type shovel, dragline and crane with a combination of power, speed and stamina that gives complete satisfaction in all classes of work. It has been given the acid test for high output in rock and fast profitable operation in coal or metal mining. You will recognize at a glance, its heavy-duty engineering which means fewer delays on the job. You will like the smooth, efficient power that flows from its big husky diesel engine; the friction free drums and shafts that rotate on anti-friction bearings and the ease of control through air actuated clutches. These advantages and many more all add up to performance that pays off with fewer delays and bigger profits. You will like the Type 2400—6 yd. Shovel, 110 Ton Crane.

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Construction Equipment Division
Lima, Ohio, U.S.A.

CAPACITIES: Shovels ¾ to 6 cu. yds. Cranes to 110 tons. Draglines, variable

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Earthwork Problems On Gavins Point Dam

(Continued from preceding page)

ments throughout this area.

First power is scheduled for 1956 and will amount to 33,000 kw with the total capacity of 100,000 kw to follow in 1957 on completion of the entire project.

One of the main functions of Gavins Point Dam will be to act as a regulating reservoir for Fort Randall and as such, the level of the pool will have only minor fluctuations. Control will be by spillway with all releases for downstream requirements made through the powerhouse, which will eliminate the need for diversion tunnels.

The dam will have a good benefit-to-cost ratio, according to studies made by the Corps of Engineers, which show a 1.18 to 1 ratio for Gavins Point alone besides increasing the power benefits at Fort Randall by $5,000,000. Estimated annual benefits from Gavins Point are: power, $3,070,000; and flood control, $350,000. Annual charges to amortize and operate the project are estimated at $2,910,000. The Gavins Point project will permit unrestricted peaking operations for power at Fort Randall without interference with navigation.

A Northwest 3-yard 80-D dragline loads 25-yard "Euc". That's a Northwest 95 in the background.

Contractor Builds Dike

After List & Clark moved in and found the river had suddenly changed to the south side of the island instead of the north side, where it was when they figured the job, they had to plan for forcing it back into the old channel.

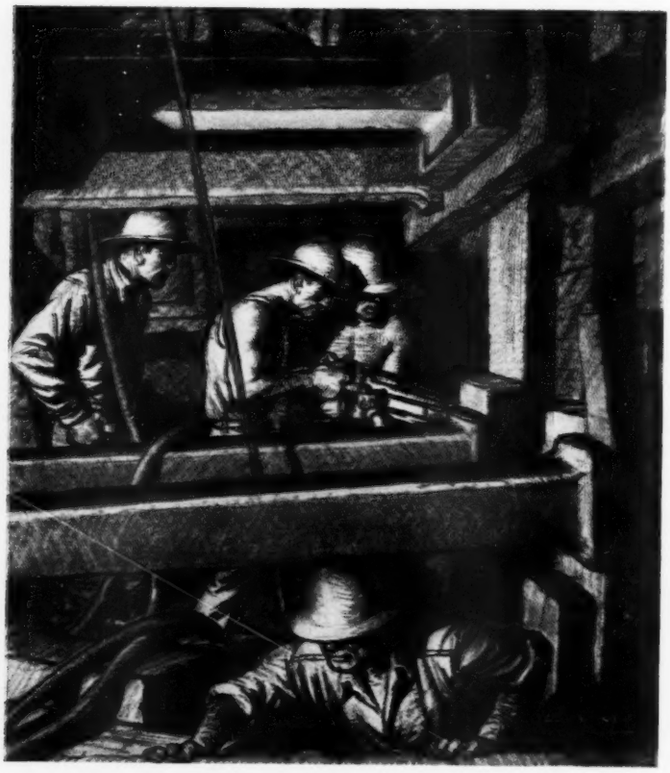
The contractor decided to build a dike and fortunately an excess of chalk from the powerhouse site could be used for this purpose. Termed a trail dike, it was started from the Nebraska bank and is more than 3,000 feet long with a minimum width of 80 feet. Luckily the dike did not have to be removed. An opening was kicked in it at the proper time and the river spread it out on the bottom in short order.

Excavation Difficulties

The peculiar moisture-holding faculties of the silt and chalk rock made excavation a troublesome task. While some of the moisture may have been trapped in prehistoric times, the spring flood was blamed for most of the excess moisture, since all of the excavation areas were under at least 4 feet of water last spring. In attempts to dry it out, some of the excavated material was stockpiled without success. In the midst of these difficulties, the contractor built one of the best haul roads in the country—smooth, wide, and safe—with less than a 7 per cent grade. Haul from powerhouse excavation to the base of the dam where the material was laid down was about a mile.

Loading and Hauling

For digging and loading, two 3-yard 80-D Northwests, one hooked up as a shovel and the other as a dragline with a 50-foot boom, were used. A 3-yard Model 95 Northwest dragline with a 50-foot boom, a Model 6 Northwest with a 2½-yard capacity and a 50-foot reach, and a ¾-yard Model 25 with a



On the job...and on the bond

EXPERIENCE COUNTS

To witness the herculean task of constructing a vital transportation link beneath the perilous bed of a surging river is to see revealed the unsurpassed magnitude of the American construction industry.

And to watch the required technical skill and resourcefulness in action is to know the meaning of experience.

The same is true in the related field of contract bonding. The experience of the Ætna Casualty and Surety Company manifests itself in the prompt, intelligent fulfillment of bonding needs on jobs of any type or size . . . by giving speedy, dependable service whenever and wherever you need it. Why not let Ætna's broad experience work for you next time you require a contract bond.

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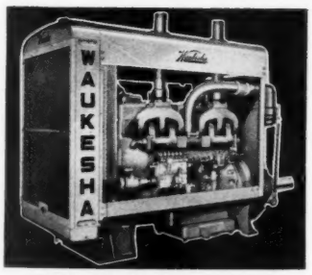
WAUKESHA Diesel POWER UNITS



WAUKESHA Super-Duty DIESEL (6-WAKDU) six cylinders, 6¼-in. x 6½ in., 1197 cu. in. displacement, 210 hp. maximum

WHY are Waukesha Diesels so specially adapted to the general contractor's needs—for powering rock crushing, gravel screening-washing machinery, conveyors, shovels, cranes, pumps, mixers, pavers, hoists, and portable compressors and generators . . .

Outstandingly lively pick-up . . . quick response to power demand . . . high economy . . . ability to burn cleanly all modern "high speed Diesel fuels" of 45 cetane or above . . . starts easily . . . runs smoothly . . . maintenance is simpler and costs less . . . and Waukesha Diesels are easy to understand and operate. They range all the way from the small four-cylinder with a maximum of 29 hp., to the largest six-cylinder with its 357 hp. maximum. Bulletin 1418 tells you how Waukesha builds dependability into these Diesels—send for it.

WAUKESHA MOTOR COMPANY
WAUKESHA, WISCONSIN
NEW YORK • TULSA • LOS ANGELES

40-foot boom were all strategically located in rock and dirt to keep wagons loaded and moving.

Though excavation was assisted in both mud and semi-mud by dozing, most of the nine D8 Caterpillar dozers were used in helping spread the fill. One Allis-Chalmers HD-20 dozer with an Allison torque converter was kept busy bucking the bigger loads. Ten 25-yard Euclid bottom-dumps, 5 with Cummins engines and 5 with Budas, and twelve 13-yard "Eucs" with GM engines comprised the hauling fleet.

A job like Gavins Point required a marine fleet, since part of the work had to be in the water. For this purpose, the contractor had a tugboat powered with a 160-hp Chrysler marine engine and four barges.

Hauls were speedy despite comparatively slow loading, and about 18,000 yards was deposited daily in the base area. This was leveled out in 8-inch uncompacted lifts. Compaction was handled by two Gebhard sheepsfoot rollers pulled by D8's and a 50-ton sand-ballasted pneumatic roller. Two No. 12 Caterpillar graders were used for finishing.

Quantities and Personnel

Major items on the job included:

Earth and rock excavation	8,530,000 cu. yds.
Stage 1 excavation	2,000,000 cu. yds.
Spillway and powerhouse concrete	308,000 cu. yds.

List & Clark had a crew of 150 men working two 10-hour shifts. Night-shift lighting was supplied by 5 Caterpillar generator sets with floods mounted on 50-foot towers. A. B. Peters was General Superintendent for the contractor, and Charles Ing was Project Engineer. For the Corps of Engineers, U. S. Army, Col. Hubert S. Miller, Omaha, is District Engineer; John Hays is Area Engineer; and Henry C. Ranspot is Assistant Area Engineer.

Other Contracts

Several other contracts have been let in connection with Stage 1 of the project and those for the next stages are planned for letting this winter and early spring.

A contract for an access road from U. S. 81 to the dam site was let to Ray Millis Construction Co. for $110,000. Two bridges on the access road were awarded to Central States Bridge Co., for $78,000 and G. H. Lindekugel & Sons will surface the access road for $202,000.

Baldwin-Lima-Hamilton Corp. will furnish the turbines for $3,009,576 with installation to be completed by March, 1956. General Electric Co. will supply the generators which will cost $3,230,136 with completion scheduled for December, 1956.

Foundation and substructure contracts will be let this winter. The Corps of Engineers is doing all the design plans except for the power plant, which is being handled by Harza Engineering Co., Chicago.

Improved Barrel Pump

An improved barrel pump is offered by Engineered Equipment Co., Box 207, Warsaw, Ind. The Model 101 will handle a wide range of fluids, including viscous

or oily liquids such as motor and fuel oils.

A turn of the handle in one direction drains the barrel; the opposite direction fills it. It empties a 55-gallon drum in 8 to 10 minutes, the company reports. The unit is self-priming, continuous flowing, and non-dripping. It weighs 8 pounds.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 921.

Most Engineering Students

The American Society for Engineering Education has compiled the latest figures showing which universities and colleges are training most of the nation's engineering students. The three institutions with the largest enrollments of engineering students are Illinois Institute of Technology with 5,703; Brooklyn Polytechnic with 5,029; and Purdue University with 4,111. Illinois Tech has enrolled more engineering students than any other institution for the past seven years.

Colleges enrolling over 3,000 engineering aspirants are, in the following order, University of Illinois, New York University, College of the City of New York, Massachusetts Institute of Technology, and Rensselaer. Georgia Institute of Technology and Pennsylvania State rank ninth and tenth with over 2,500.

Equipment-Research Data

How equipment is engineered to perform is described in a 12-page booklet published by Caterpillar Tractor Co., Peoria 8, Ill. It presents a pictorial inspection of research and engineering operations. Special tests and experiments are pictured and explained. Experiments are matched against operating conditions to show the comparison.

Strain tests on parts, tractor and engine laboratory work, fuel-injection analysis, proving-ground operations, and "cold-room" experiments at 65 degrees below zero are a few of the topics treated in the booklet.

The booklet lists improvements in the D4 tractor and the development of the Caterpillar oil filter.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 892.

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Diamond and Shot Core Borings
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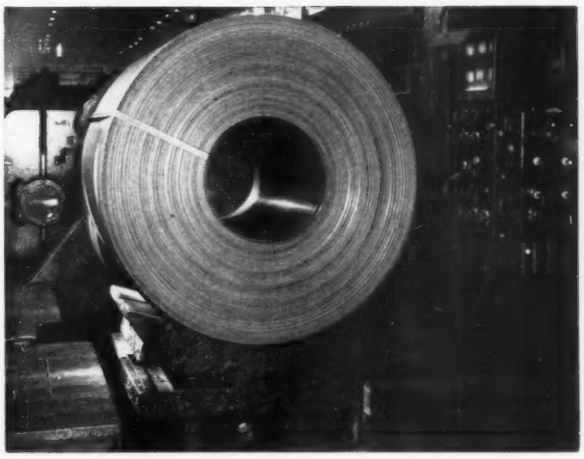
Grout Holes and Pressure Grouting
Foundation Testing for Bridges, Dams and all Heavy Structures

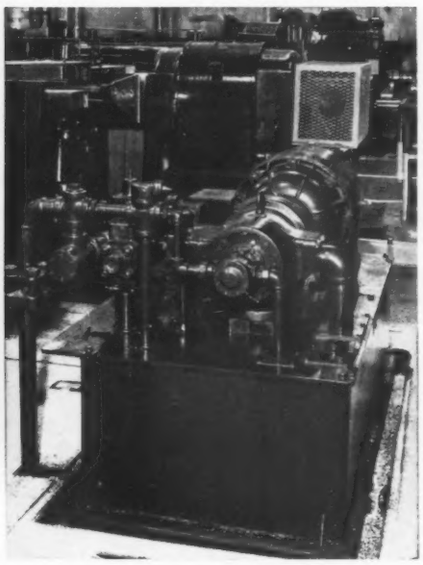
Manufacturers, also, of Diamond Core Drilling Machines and complete accessory equipment, including all types of Diamond Drilling Bits.

SPRAGUE & HENWOOD, INC.
Dept. C, Scranton 2, Pa.

—At UNITED STATES STEEL—



Coil cradle on United States Steel Company's Irvin Works Three-Stand Cold Reduction Mill. Marvel Synclinal Filters are a part of the mill's main hydraulic system which operates this cradle as well as other hydraulic machines.

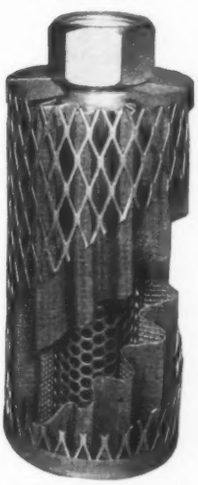


Hydraulic pump and tank on the reeeller hydraulic system of United States Steel Company's Gary Sheet and Tin Mill's Continuous Galvanizing Line. A Marvel Synclinal Filter is installed inside the tank on the suction line.

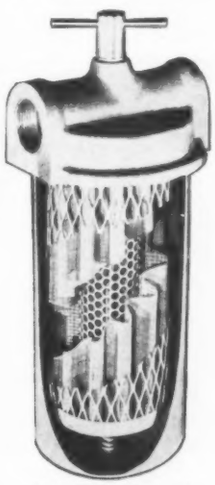
and with Hundreds of Others

MARVEL SYNCLINAL FILTERS PROTECT HYDRAULIC EQUIPMENT

IN 1951 ALONE OVER 30,000 MARVEL SYNCLINAL FILTERS have been specified for installation on all types of hydraulic and oil recirculating equipment. In the plants of America's industrial giants as well as in the plants of smaller businesses, Marvel Synclinal Filters are doing a job protecting machines and increasing production. They are proving their superiority in the one real test — on the job. Records show Marvel Synclinal Filters operating longer between cleanings, requiring less attention, cutting down time, and in short, achieving more production with less maintenance. Not only plant operators, but also over 300 manufacturers of machines have recognized the superiority of Marvel Synclinal Filters, and now install them as original equipment.



SUMP TYPE (Cutaway)



LINE TYPE (Cutaway)

A SIZE FOR EVERY NEED in filtering non-corrosive liquids in hydraulic and low pressure systems. Sump and line type models available in capacities from 5 to 100 g.p.m. and in mesh sizes from 30 to 200. All models may be quickly disassembled, cleaned and reassembled on the spot by any workman. Line types operate in any position and are easily serviced without disturbing pipe connections.

★ WATER FILTERS — In response to the great demand, we have adapted both our sump and line types for use in all water filtering applications. No changes have been made in the basic synclinal design.

Write for Complete Engineering Data—Specify Oil or Water

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625 W. Jackson Blvd. Chicago 6, Ill.

H-Bomb Plant Spurs New Road Building

South Carolina Constructs Perimeter Route Around Edge of Savannah River Plant; Surface Treatment on Sand-Clay Base

• SPRAWLING over 315 square miles of South Carolina countryside, the Savannah River Project of the U. S. Atomic Energy Commission has created a road block of mammoth proportions—just about five times the size of the District of Columbia. The fenced-in plant area, along the left bank of the Savannah, extends over sizable portions of both Aiken and Barnwell Counties. A new four-lane divided highway runs from the center of the project to Augusta, Ga. (See C. & E. M., July, 1951, pg. 5). A similar highway comes into the site from Aiken, S. C. These two cities, largest in the vicinity of the hydrogen-bomb plant, lie about 15 miles to the northwest.

These new modern roads go into the plant area but not through it, and the main highways that formerly traversed the once thinly populated region are closed off. Consequently, traffic between Barnwell, the county seat, and Augusta or Aiken was forced to follow circuitous routes that went well beyond the boundaries of the restricted area.

Aware of the need for a faster route between points on either side of the large mysterious area, the South Carolina State Highway Department decided to build a road that would skirt the edge of the plant area and save 6 miles on the trip from Barnwell to Augusta. The Department awarded a contract for this road, 12.5 miles long, to Spotts & Co. of Newberry, S. C., on its low bid of $266,785.84. Work got under way on March 11 this year and was completed by the end of September.

The type of construction is typical for this part of South Carolina, with a sand-clay base covered by a bituminous-surface treatment. Beginning at a point on State Route 37, north of Barnwell, the new road follows State Routes 68 and 274 northwesterly to meet State Route 781 west of Williston. The lower half of the route follows a former farm-to-market road, while the upper half is entirely on new location. The alignment cuts through the rolling hill country as it skirts the edge of the H-bomb plant.

Grading Operations

Along the old road the 66-foot right-of-way was held, but for the new location a 100-foot right-of-way was obtained. On the lower end, the old bituminous 18-foot-wide surface-treated pavement was scarified to a depth of about 2 inches for a better bond. Four inches of sand-clay material was added to the 6 inches in place, making a 10-inch base.

The bulk of the grading work was at the upper end of the project, where 15-foot cuts and 20-foot fills were encountered. The 117,458 cubic yards of common excavation, however, balanced out. A pair of Tournapulls handled the bulk of the grading. In a few places, they had to make a 2-mile haul. but the average was half a mile.

A typical section of the new highway shows a 24-foot pavement with a 2-inch center crown; the bituminous mat is about ⅝-inch thick. Beneath the pavement is the earth-type or sand-clay base of 10-inch uniform thickness, 25 feet in width. The sand-clay is carried out through the shoulders to the slope lines, decreasing in depth to 6 inches.

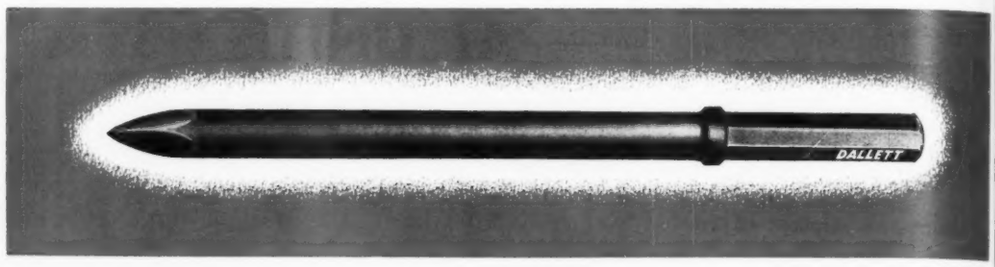
C. & E. M. Photo

A Lima Paymaster ¾-yard shovel loads an International truck with sand-clay base course material for the road around the AEC's Savannah River Project, S. C.

Shoulders are 8 feet wide on a 12-to-1 slope, and are covered with 4 inches of top soil. Slopes in both cuts and fills are 2 to 1, and the ditches are 1 foot 9½ inches deep.

Sand-Clay Base Course

Sand-clay material for a base course came from five different borrow pits with the average haul 2 miles long. A pair of Lima Paymaster ¾-yard shovels



BIG CITY BUYS 3211 DALLETT CONTRACTORS STEELS, REPORTS ONLY FOUR BREAKAGES

A big eastern city was plagued with breakages of contractors steels. Broken steels were slowing up work and increasing costs. About two years ago, they tried Dallett Contractors Steels with the agreement that all breakages would be reported.

They have purchased 2423 Dallett Moil Points and 788 Dallett Asphalt Cutters during the past two years. At the last check, they had reported only four moil points **and no asphalt cutters** that had broken before the first sharpening. In the past, asphalt cutter breakage had been most troublesome.

The city officials liked the service given by Dallett Contractors Steels so well that they have virtually standardized on them for all departments.

When you figure it out, the breakage rate for this customer was about one-eighth of one percent—an almost perfect record! If you, too, are having trouble, order some steels from us today. Try them out and keep records. You will want to standardize on Dallett Contractors Steels.

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C. & E. M. Photo

The truck piles the material in the center of the old bituminous pavement, now scarified. Spotts & Co., Newberry, S. C., was the contractor for the 12½-mile job.

worked the pits, loading out to a fleet of 12 trucks averaging 4½ yards a load. In general, the pits have a layer of sand on top with clay on the bottom, and a mixture of sand and clay in between. They average 10 feet in depth —4 feet of sand on top followed by a 3-foot mixture, and 3 feet of clay on the bottom. Skilled shovel operators did a good mixing job as they worked the face of the pit, mixing sand and clay together with each bite of the shovel.

Silt and clay in the earth-type soil averaged 18 per cent, with the rest of the material mostly sand. According to the specifications, 100 per cent of the material must pass the 1½-inch screen while at least 35 per cent must pass the No. 10 but be retained on the No. 60 screen. In these pits about 55 per cent of the material was retained on the No. 60 screen according to the field analysis.

When the trucks hauled the sand-clay material from the borrow pits to the job, they dumped it in a windrow along the center of the roadbed. A pair of Caterpillar motor graders spread the material out over the roadbed in 5-inch layers. Each of the two 5-inch layers was compacted by Tampo sheepsfoot and rubber-tire rollers pulled by International TD-9 rubber-tired tractors. A disk harrow was used at times to break up clods of material; the harrow was pulled by a Caterpillar D7 tractor.

Emphasis on Compaction

In building embankments, the contractor compacted the fills to a density of not less than 90 per cent of the density obtained by AASHO specifications T-99. This compaction was satisfactorily obtained by sheepsfoot rollers. A similar density was required in cut sections where the subgrade, for a width 1½ feet beyond the pavement on each side, was compacted to a depth of 6 inches below the surface. In the earth-type base course the standards of compaction were raised to 95 per cent. Each of the two 5-inch layers was separately mixed, shaped, and compacted to the required density. Water was added as needed to bring about the optimum moisture. A 2,000-gallon International tank truck wet down the material from a spraybar at the rear.

Surface Treatment

Then the base course was given a prime of MC-O asphalt applied at the rate of 0.3 to 0.35 gallons per square yard at a temperature ranging between 125 and 150 degrees F. About a week after the priming, the bituminous-surface treatment was put on. This consisted of an application of hot asphalt, 150 to 200-penetration, applied at the rate of 0.4 gallon per square yard at a temperature of 340 degrees F. The bitumen was covered with 47 pounds per square yard of No. 3 stone. Steel-wheel rollers compacted the stone, and any excess material was uniformed with a power broom.

Then the distributor put on an application of RC-2 asphalt at the rate of 0.14 gallon per square yard. This shot was followed by 22 pounds of No. 9 stone. A final shot of RC-2 asphalt was next applied at the rate of 0.28 gallon per square yard. After about 2 hours, the steel-wheel rollers were put on the road. A week later the rollers were brought in again for back rolling, and then the road was opened to traffic. During all these operations, traffic was maintained over the lower end of the project where the new road was built over the old one. During the curing period following the top shot of RC-2, full advantage was taken of the 8-foot shoulders. Traffic was no problem on the upper end where the alignment was entirely on new location.

Gradation of the two sizes of stone used in the surface treatment, was as follows:

Sieve Size	Per Cent Passing	
	No. 3 Stone	No. 9 Stone
1½ inch	100	....
1 inch	85-100	..
¾ inch	25-55	....
½ inch	0-10	100
⅜ inch	..	80-100
No. 4	0-2	20-50
No. 16	....	0-6
No. 100	..	0-2

Principal drainage structures on the 1½-mile project consisted of three reinforced-concrete box culverts — a single 10 x 8 x 82-foot, a triple 10 x 8 x 48-foot, and a quadruple 10 x 8 x 46-foot.

Quantities and Personnel

Major items in the contract included:

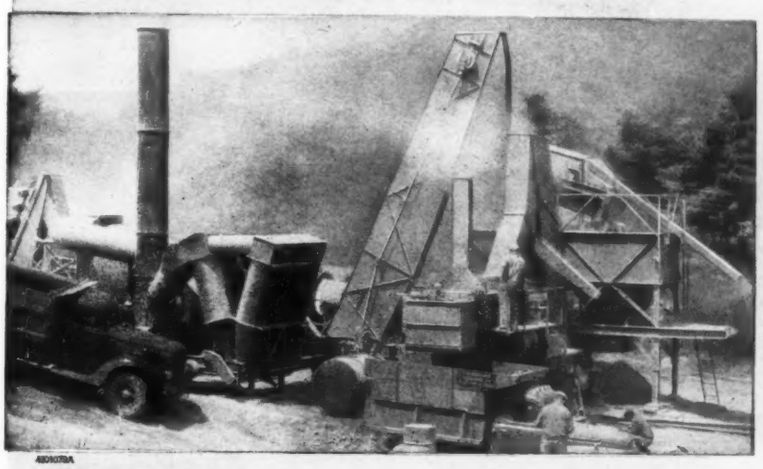
Clearing	49 acres
Common excavation	117,458 cu. yds.
Selected shoulder material	13,582 cu. yds.
Earth-type base course	68,638 cu. yds.
Bituminous surfacing	183,316 sq. yds.
RS-pipe, 15 to 36-inch	2,828 lin. ft.
Concrete gutter, 18-inch bottom	1,175 lin. ft.

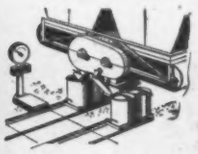
Spotts & Co., the contractor, employed an average force of 35 men on the job under the direction of Superintendent Lee F. Epting, assisted by Billy Graham.

For the South Carolina State Highway Department, W. F. Stokes is Project Engineer. The job is located in District 7, of which C. D. Campbell is District Engineer with headquarters at Orangeburg, S. C. The Department is headed by C. R. McMillan, Chief Highway Commissioner. S. N. Pearman is State Highway Engineer, and J. D. McMahan, Jr., Construction Engineer.

Barber-Greene

BITUMINOUS MIXING PLANTS





Mix sampling and calibration facilities provided on B-G High Capacity Plants for mixing highest type 3-and-4 aggregate mixes. Convenient, accurate calibration by weight.

ACCURATE MIX CALIBRATION...BY WEIGHT ON A CONTINUOUS FLOW BASIS CONVENIENT FOR OPERATOR AND INSPECTOR!

Barber-Greene Bituminous Mixing Plants provide many control features not offered in any other type of plant. Here are a few of the provisions that help accomplish these advantages:

AGGREGATE GATES, when set to feed the correct amount of aggregate from each bin, may be locked in position.

OVERFLOW SPOUTS are provided on each aggregate bin for balancing aggregate by rejecting any excess of any size in the bins.

AUTOMATIC CUT-OUT stops plant operation in case of deficiency of any aggregate size.

FINES FEEDER for introducing mineral filler in correct proportion to total mix.

GRADATION UNIT SCREEN and bin design permit separation of aggregate into 2, 3 or 4 fractions to meet *any* specifications.

DUST COLLECTOR for use with any plant when it is necessary to conserve desirable fines in aggregate.

BY-PASS GATE for convenient calibration, inspection and sampling. Aggregate in each bin may be individually sampled without interference to plant operation and production.

BY-PASS GATE ahead of pug mill. Composite aggregate sample may be obtained for convenient testing without interfering with operation and production.

ACCURATE, POSITIVE-DISPLACEMENT bitumen metering pump with interlocked drive to aggregate feeders to guarantee unvarying proportion of bitumen to aggregate.

Barber-Greene BG

Aurora, Illinois, U.S.A.

It was a big day for Trailmobile, Inc., when Neva Jane Langley—Miss America 1953—presided over the presentation of a new Trailmobile truck-tractor to company sales executives in Cleveland, Ohio. At a dinner afterwards, William A. Burns, President of the company, a subsidiary of Fullman, Inc., helps the Georgia beauty with a flowery Trailmobile model.

New Portable Heater

A new portable heater and dryer which is said to be ideal for winter construction jobs has been introduced by International Mfg. Co., 2249 S. Delaware St., Denver, Colo.

The Chinook Wind heater operates with either propane or butane gas. The company reports that it is safe, free from smoke, soot, fumes, and carbon monoxide, and may be used under any conditions, inside or outside of buildings.

It is 2 feet wide, 3 feet high, and 4 feet deep, and weighs 150 pounds. It may be moved by one man, utilizing its rubber-tired, semipneumatic, ball-bearing wheels. The heating unit is a cast-iron torch with a motor-driven fan, delivering a maximum capacity of 3,500 cfm at 250 degrees, 500,000-Btu maximum capacity.

A smaller model, the Little Chinook, with a capacity of 500 cfm at 250 degrees, delivers 100,000 Btu's. It is 18 inches wide, 23 inches high, and 11 inches deep, and weighs 35 pounds.

Since the fire hazard is practically eliminated using liquid propane gas, the heater can be used on inside jobs in communities where ordinances ban oil and gasoline types. Where ordinances require the fuel source to be outside, the Chinook Wind still can be taken inside, with its hose or copper tubing bringing in gas from the tank outside.

The heater's removable torch has a dual purpose. It may be readily placed in the burner-channel assembly, which automatically locates it for instant use, and it is said to be easily removable for any type of heating work.

Another unit made by the company is the Chinook all-purpose torch and weed-burner for thawing ground, pipes, equipment, and for preheating welding work. The torch has a 750,000 to 50,000-Btu capacity.

Flexible 12-inch-diameter canvas duct, in 12 and 24-foot lengths, reinforced, flameproofed, and waterproofed, is available for the Chinook Wind to carry the heat to the exact spot needed.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 858.

Clamp for Hydraulic Hose

Split-flange-type clamps for hydraulic-hose assemblies are covered in a bulletin issued by Anchor Coupling Co., Inc., E. Church & 4th Sts., Libertyville, Ill. Available in straight or angle styles for 1 or 2-wire braid hose, the clamps range from ½ to 2 inches ID.

The bulletin points out that the clamps are useful for high, medium, or low-pressure service and suction lines. They can be assembled with an ordinary automotive wrench, and are said to be leakproof and strong.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 867.

the New

OLIVER "OC-18"

the Operator's Dream come true!

Here's a tractor that has been designed specifically to make life as easy as possible for the operator. Just check this list of "easy operating" features —it puts the "OC-18" 'way out in front as the tractor that gets more done . . . faster . . . every day.

1. Over-Center Clutch. The clutch bar runs across the full width of the dashboard. No need here for the operator to hunt for a single lever . . . to take his eyes off the work.

2. Air Steering is *Standard Equipment* You can steer the "OC-18" with just two fingers of one hand.

3. Push Button Electric Starting. The husky starter of the "OC-18" gets the engine going . . . quick.

4. Cold Weather Starting Aid . . . standard equipment on the Oliver "OC-18" for fast, easy starting in extremely low temperatures.

5. Center-Positioned Gear Shift Lever . . . is located right where it's easiest to reach.

6. Ample Leg Room . . . no cramped legs after a hard day's work with the "OC-18".

7. Convenient Foot Parking Brakes are standard equipment on the "OC-18".

8. Comfortable, Two-Man Seat . . . plenty of room for two men in this upholstered seat.

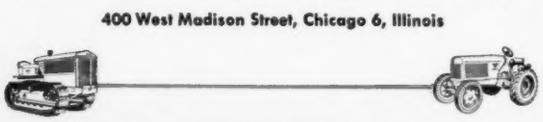
9. Easy-Acting Friction Throttle is located at the right arm rest of the seat in the most convenient position for the operator.

You get plus performance too! A full 126 drawbar horsepower . . . greater stability . . . more track on the ground. Just note the photograph. See how the track hugs the ground almost its entire length. It means real pulling power . . . greater stability and better balance for dozing.

Try out this great new tractor yourself. Ask your Oliver Industrial Distributor to arrange a demonstration. When you've seen the "OC-18", you'll never be satisfied with any other big tractor.

THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Illinois



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keeps walls dry

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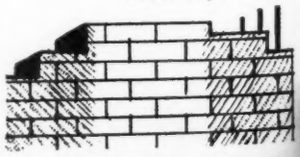

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It Pays to Tighten Compressed-Air Lines

One of the greatest production robbers of a compressed-air system is low pressure. It has been found that if the pressure at a pneumatic tool falls from 90 psi to 79 psi, production output of that tool may drop as much as 35 per cent.

Somewhat more specific is the case of the air motor, which is used extensively to power air tools because it offers more horsepower per unit weight than other comparable power sources. Because compressed-air systems in most plants utilize pressures between 90 and 110 psi, air motors are designed to operate within those working pressures. An air motor built to operate at 90 psi, however, will lose 25 per cent of its capacity if line losses in delivering air drop the pressure to 70 psi.

The first inclination, when air pressures drop, may be to place the blame on insufficient compressor capacity. But checking the air-distribution system first may save the cost of new compressor equipment.

Checking for leaks—one of the main causes of low pressure—is a relatively simple matter. Results have proved that the most likely locations of small leaks are around valve stems, hose connections, unions, drains, home-made blow guns, and lines leading to inoperative tools or those subjected to unusually rugged treatment. Inspections should be made monthly.

Among the most frequently used leak checks are the lighted candle or the solution of soapy water which is brushed around suspected areas. One user puts essence of peppermint into the air system so he can detect the slightest leak by its odor. Still another method uses a small siren-like whistle, activated by air flow, which is passed over the lines. Regardless of what method is adopted, when leaks are found, patch them immediately.

Some leaks may be very small, appearing trivial in themselves. But small or not, they may be numerous and have a high accumulative effect. This dollar and cents waste more than justifies scheduled maintenance of air-distribution systems.

New Electric Plant

A new 3,500-watt ac electric generating plant has been announced by D. W. Onan & Sons Inc., University Ave., Minneapolis 14, Minn. The 115-volt 60-cycle unit is powered by an Onan CK 2-cylinder 4-cycle air-cooled gasoline engine.

The Model 305CK is said to draw up to 4,000 watts of power at intervals for two-hour periods. This allows extra power for peak loads or borderline emergency power applications. Voltage regulation on the new model is plus or minus 3 per cent.

The 4-cycle CK engine is said to deliver its full rated load with fuel consumption of 0.68 gph. The Onan revolving armature generator is direct-connected to the engine for trouble-free permanent alignment.

Model 305CK is available in manual or remote-starting models. Manual plants are equipped with the Onan Readi-Pull starter. Remote-starting units are electrically cranked with the generator acting as the cranking motor. Start-stop stations make starting from remote areas away from the plant possible.

Fully automatic and line-transfer controls are available for remote starting units. For standby service, the line-transfer control will automatically start the unit, within seconds, after highline power fails, the company claims. When power is restored the plant is stopped automatically.

The Model 305CK provides primary or emergency electric power for stationary, portable, or mobile applications.

Further information may be secured from the company by requesting Form A-100-L. Or use the Request Card on page 18. Circle No. 916.

Data on Elevating Graders

Actual job data sheets are the basis for the factual information presented in a new 8-page application booklet issued by Ulrich Products Corp., Roanoke, Ill.

The folder shows the company's Domor elevating grader on a variety of projects across the nation. Production figures and job descriptions on loading, terracing, casting, ditching, etc., are given in detail.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 947.

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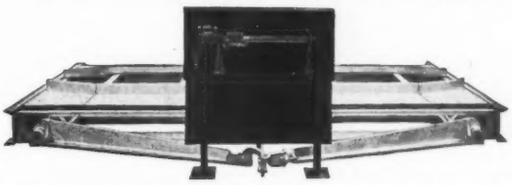
"THE CONTRACTORS' SPECIAL SCALE"



For use at temporary and permanent locations—at stock piles and by bituminous material contractors at the job site. Capacities: 15-18-20-30 tons.

Write us for name of your nearest distributor.

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P. O. Box 1198 Terre Haute, Indiana

How many different oils and greases do you now carry to keep your earth-moving machinery running?
With Shell's "3-Barrel" plan you need only three!*
*SHELL RETINAX A GREASE
. . . a superior new multi-purpose grease for all types of heavy-duty automotive vehicles. Shell Retinax A Grease does the job of four or more specialized greases—yet only one gun is required.
Recommended for all grease-lubricated points on chassis, wheel bearings, universal joints, and water pumps, Shell Retinax A gives you better protection against excessive wear and washing out.
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. . . an exceptional "alloy type," Extreme Pressure gear oil. Shell Spirax EP is recommended for rear axles of the hypoid, spiral bevel, and spur gear types . . . and heavy-duty transmissions. It is extremely stable . . . has long-lasting anti-rust and film strength properties. Results: longer gear life, lower maintenance costs.
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. . . for all engine crankcase lubrication, Shell Rotella Oil is a new, fortified, extra heavy-duty lubricant which has set new standards of anti-wear, anti-fouling performance in high speed diesel and heavy duty gasoline engines. By maintaining clean engines and minimizing sludge formation, piston lacquering, ring and valve sticking, and port clogging, Shell Rotella Oil extends periods between overhauls, reduces parts replacement costs, and gives you reduced oil consumption.
†Some manufacturers recommend a straight mineral oil for gear lubrication. Your Shell Lubrication Engineer will suggest the proper lubricant in such cases.
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Underpass Closure Built on Riverfront

Dual Swing Gates Close 84-Foot Opening in Floodwall and Protect Railway Underpass at High Waters

• A SMALL underpass-closure structure recently built on the river edge of East St. Louis, Mo., is part of the U. S. Army Corps of Engineers' relentless battle to prevent floods from devastating cities along the banks of the Mississippi. This relatively small structure, contracted to J. S. Alberici Construction Co., Inc., of St. Louis, Mo., on a $155,000 low bid, is part of the Corps' over-all program for 1952. The St. Louis District Office awarded the contract in April, 1951. It calls for the construction of reinforced-concrete buttresses supporting two pairs of steel miter gates which will close a gap in the wall at an underpass of the Terminal Railway Association line. Open, the gates provide access to the riverfront—closed, they protect the East Side Levee and Sanitary District from floods.

The contract also provided for the constructon of new reinforced-concrete floodwall sections on each side of the structure, driving a steel sheet cutoff wall below the floodwall and structure, building RC retaining walls to hold back the railway embankment, and additional work on the floodway revetment and subdrainage system.

Design

The closure structure is located directly in front of the underpass. Its substantial base is 83 feet 6 inches long, 29 feet wide, and varies in thickness from 4 feet 6 inches (at the center) to 3 feet 4 inches (at the ends). This base slab contains about 380 cubic yards of concrete. A toe wall extends 9 feet 6 inches below the base along the river side. The front face is vertical, the back face battered ½ inch to the foot—making it 2 feet 4 inches thick at the bottom and 3 feet 3 inches thick where it joins the slab. The 22-foot-long sections of MZ 22 steel-sheet piling extend 2 feet up into the toe.

The structure is symmetrical about its centerline. Buttresses rise up to the top of the floodwall, elevation 429.2, 19 feet 8¾ inches above the slab, and are tied together by the slab and by a 3-foot x 3-foot 4-inch overhead tie beam. Clear span between buttresses is 33 feet 9 inches. The end walls, 32 feet long x 20 feet high, are at right angles to the floodwall. The center wall slopes down at a near 45-degree angle to a point 24 feet from the back of the slab. The walls are 24 inches thick, fully reinforced.

Each gate is 19 feet 10⅜ inches high and 18 feet 3⅜ inches wide. Except during periods of high water, the gates are chained back against the walls. Fully closed they are at an 18½-degree angle with the back edge of the slab. Sill plates and rubber water stops insure their watertightness.

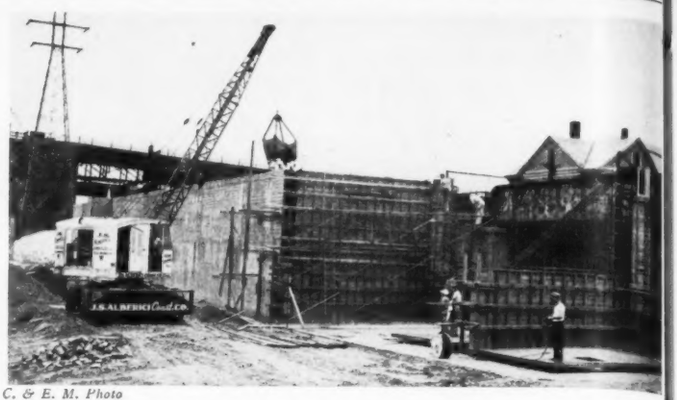
Three new floodwall sections—two 20 feet long, one approximately 15 feet long—were constructed on each side of the closure structure. Cross section of the wall is in the shape of an inverted T. The wall is 24 feet high, with a 20-foot-wide base. A toe wall extends 5 feet 9 inches below the base. The 18-foot-lengths of MP 112 sheeting for the cutoff extend 2 feet up into the toe.

Construction

First operation on the job was the removal of revetment stone on the levee in the area of the proposed structure. Alberici used an International TD-14 with a high-lift shovel front for this work. A Koehring 304 Cruiser Crane with a ¾-yard Owen clamshell then excavated about 1,200 yards of earth for the placement of the base slab and toe walls. The sheet-piling cutoff wall was next on the schedule. Alberici drove the sheeting with a No. 2 Vulcan hammer. The leads hung from the boom of a Manitowoc 2000B brought in for the job.

Forms were made up on the site. For the toe sections, the contractor used Symons 2 x 4-foot panels with Symons 2-inch break-back ties. The base slab and wall forms were made up of 1 x 6 tongue-and-groove sheeting backed by 2 x 4 studs 16 inches on centers and double 2 x 4 wales. Superior coil ties secured and spaced the forms. All forms received a coating of light paraffin oil prior to the concrete pours.

V. H. Flannery, of East St. Louis, Ill.



C. & E. M. Photo

A Koehring 304 Cruiser Crane backfills behind sections of the floodwall on the East St. Louis, Mo., underpass-closure job. Left and right-hand forms are for the north and center walls respectively.

Stoody Alloys save shovel parts!

Hard-Facing restores life at a fraction of new part cost!

You can get new and longer life from worn shovel parts by hard-facing with Stoody Alloys! Cost of reclamation is far less than for new parts. Regular maintenance procedures thereafter save costly down-time, spare parts inventory and needless replacements.

Check your shovels today against the suggested rebuilding operations pictured at the right. Detailed manual procedures are described in the new revised STOODY GUIDEBOOK. Get it from your Stoody dealer or by mail.

Custom welding shops equipped to handle automatic rebuilding work are located in every section of the United States and Canada. Write for list of shops near you.

supplied the transit-mix concrete. The concrete was a 5.5-bag mix with 8 ounces of Darex added to the yard. Batch proportions per yard were as follows: 533 pounds of 1½-inch stone, 533 pounds of ¾-inch stone, 2,680 pounds of sand, 517 pounds of cement, 8 ounces of Darex, and 30.25 gallons of water. Flannery brought the batches in 5-yard Challenge mixers mounted on White trucks.

The biggest pour was the base slab—380 cubic yards. They made the complete placement in 10¼ hours, chuting the concrete directly from the trucks for all but the top 8 inches. At this point the chute angle was inadequate for proper placement, so the Koehring Cruiser was brought in with a 1-yard Insley bottom-dump bucket. The crane rig handled all of the wall and buttress sections. Two electric-powered and two gasoline-powered vibrators were on hand to insure complete consolidation of the concrete around the heavy reinforcing.

Workmen removed the forms after a minimum 2-day period. The concrete was water-cured for 14 days. All construction joints were dry-sandblasted. At the time of CONTRACTORS AND ENGINEERS MONTHLY's visit to the job the gates were still in the fabricating stage. The completed structure is designed to provide 2 feet of freeboard over a probable maximum flood.

C. & E. M. Photo

Left to right: Victor Gaehle, Alberici's Superintendent on the flood-control project at East St. Louis, Mo.; Earl Petri, Inspector, U. S. Corps of Engineers; and Lynn Dillow, Assistant Chief of the Corps' Inspection Branch.

Personnel

The contractor's forces were under the direction of Victor Gaehle, Superintendent. Earl Petri was Chief Inspector on the job for the Corps of Engineers. Garland Hastings was Project Engineer, and Harold Shaver Resident Engineer.

The St. Louis District of the Corps of Engineers supervising the construction is headed by Col. Fred E. Ressegien.

Applied Hydraulics: A Revised Handbook

The second edition of "Handbook of Applied Hydraulics" has recently been brought out by McGraw-Hill Book Co., Inc., New York, N. Y. Compiled by a staff of specialists, the book is edited by Calvin Victor Davis, Vice President of Harza Engineering Co., Chicago, Ill.

The book is a comprehensive manual. It supplies detailed reference material on all phases of hydraulic engineering, and gives concise information on the experience, advances, and methods in connection with the planning and designing of efficient hydraulic works. The practical aspects of hydraulics are highlighted in this book, which provides data on hydrology, water supply, sewerage, water power, and hydraulic structures, together with hundreds of tables, formulas, and problem-solving pointers.

The second edition features an expanded treatment of gravity dams, with an examination of recent projects in the light of structural behavior. The section on spillways has been brought up to date with new material on discharge coefficients and design advances. Discussion of important new installations has been added to the hydroelectric-plant section, and special reference is made to underground stations. Examples from actual records of outstanding projects illustrate the practical applications of the facts presented.

"Handbook of Applied Hydraulics" is available from the publisher, McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. The price is $15.00.

Literature on Salamander

Literature on the Hy-Lo oil-burning salamander is available from the Scheu Products Co., 272 Stowell St., Upland, Calif.

The Hy-Lo is said to be smokeless at both low and high burning rates. It features a return-gas-stack principle for returning consumed gas to the bowl. This gives better combustion and eliminates carbon. The unit is 62¾ inches high and has a 19-inch bowl diameter.

This literature may be obtained from the company, or by using the Request Card that is bound in at page 18. Circle No. 934.

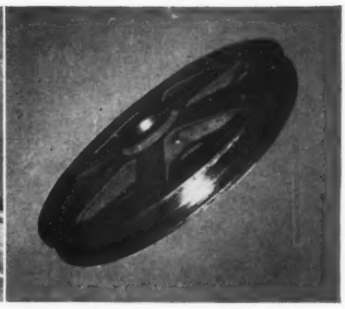
Cummins Engine Personnel

C. K. Boll, Jr., former Manager of Engine Sales, has been appointed General Sales Manager, Cummins Engine Co., Inc., Columbus, Ind. In this post, he will be responsible for sales, regional organization, and advertising.

C. B. Foster, former Manager—Contract Sales, holds the newly created position of Sales Manager—Engines. He will continue to be in charge of all Government contract work and, in addition, will take over Mr. Boll's former duties.

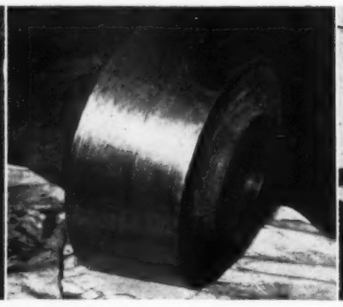
1 BUCKET TEETH, LIPS, SIDES, BOTTOMS
ALLOY: *Stoody Self-Hardening 21 or Stoody 1027.*
APPLICATION: *Manual—stringer beads or solid overlays on wear areas.*
RESULTS: *Maintains size, reduces wear, retains full bite and load.*

2 LATCH PLATES AND KEEPERS
ALLOY: *Stoody Self-Hardening or Stoody 1027.*
APPLICATION: *Manual—build to size and peen to shape while red hot.*
RESULTS: *Effects positive latch closure. Negligible cost.*

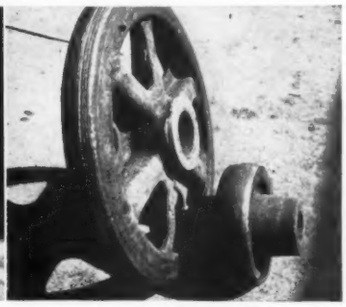


3 SHEAVES
ALLOY: *Stoody 104 or Stoody 107.*
APPLICATION: *By automatic—machinable deposit.*
RESULTS: *Prevents grooving, increases rope life.*

4 HOUSE BASE RINGS
ALLOY: *Build up with Stoody 104, finish with Stoody 107.*
APPLICATION: *By automatic—machinable surface.*
RESULTS: *Reclamation ¼ of new ring cost.*

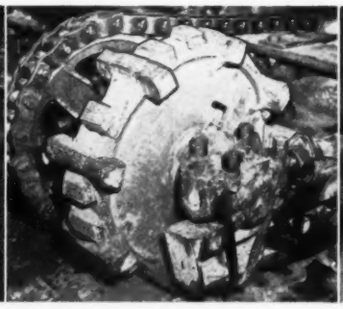


5 HOUSE ROLLERS
ALLOY: *Stoody 107.*
APPLICATION: *By automatic—machinable surface.*
RESULTS: *Restores contour, doubles life at 1/3 the cost.*

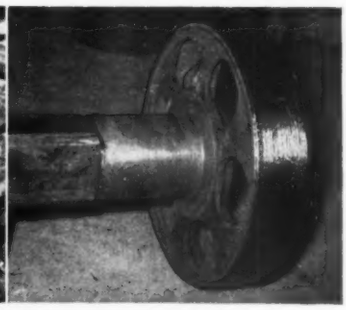


6 SHOVEL IDLERS AND ROLLERS
ALLOY: *Stoody 105.*
APPLICATION: *By automatic—no finishing necessary.*
RESULTS: *Restores wearing faces, doubles life at ½ original cost.*

7 TRACK PADS
ALLOY: *Stoody 1027.*
APPLICATION: *Manual—rebuild with Stoody High Carbon, overlay with Stoody 1027.*
RESULTS: *Doubles life at ½ cost.*



8 DRIVING TUMBLERS
ALLOY: *Coated Stoody Self-Hardening or Stoody 1027.*
APPLICATION: *Manual—rebuild drive lugs.*
RESULTS: *Doubles life at ½ original cost.*



9 SWING BRAKE DRUMS
ALLOY: *Stoody 106.*
APPLICATION: *By automatic—machine to finish.*
RESULTS: *Illustrated type reclaimed for 15% of new cost, outlasts new drum.*

See the "yellow pages" in the phone directory for your local Stoody dealer, or write for dealer list and complete literature

STOODY COMPANY
11936 E. SLAUSON AVENUE, WHITTIER, CALIFORNIA

Completely mechanize your tire-changing operation on large earth-moving vehicles. Air-powered tools can change a 27.00-33 tire in one to two hours.

Air-Powered Tools Speed Tire Handling

Removing 6 and 7-foot-high tires from large earth-moving vehicles can delay production often over half a day. Cost-conscious contractors have found that complete mechanization of the operation from beginning to end is the most economical method.

A large air-powered hydraulic jack should be used first to lift the wheel free of the ground in half a minute. The same job with a hand-powered short-lift jack and wooden blocks would probably take over 45 minutes.

The next step is to free the tire with a hydraulic tire tool. Tires as large as 27.00-33 can be changed in one or two hours. The tool forces rim flange and tire bead back to remove the lock ring. If tubes are fitted with large-bore valves and the corresponding-size air chucks and gages are used, a 27.00-33 can be inflated to 50 pounds in about 15 minutes. A small-bore valve would take over 30 minutes.

Removing lug nuts can also be speeded up by using an air-powered wrench. This saving usually amounts to about 50 per cent.

Building in Hot Climates

"Housing and Building in Hot-Humid and Hot-Dry Climates" will be the subject discussed by the Building Research Advisory Board at its conference this month. The meetings will be held at the National Academy of Sciences, Washington, D. C., on November 18 and 19. The symposium will concentrate on reviewing technological advances in the field and defining areas still in need of research. Building problems and living comfort in our southern, mid-southwestern, and far-southwestern states, and comparable tropical and subtropical areas elsewhere in the world will be emphasized.

The discussions will be divided into two parts. Part 1 will include: practical aspects of tropical living; effects of hot climates on man; and bioclimatic analysis of hot climates. Part 2 will deal with architectural design for hot climates; structures and materials in hot climates; and mechanical problems in hot climates. Following each session will be extemporaneous round-table panel discussions and questions from members of the audience.

Those wishing to attend may secure registration forms by writing the Building Research Advisory Board, 2101 Constitution Ave., N. W., Washington 25, D. C.

Data on Snow Plows

A catalog describing snow plows in capacities of 1½ to 6-tons for rear-wheel-drive trucks and 1½ to 4 tons for 4-wheel-drive trucks has been issued by Wausau Iron Works, Wausau, Wis.

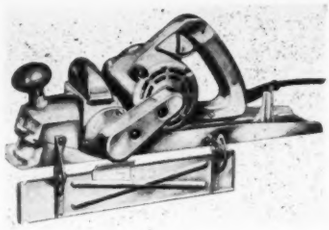
It contains complete specifications and descriptions. Diagrams show universal underframe hitches and typical "tailored" front hitches.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 891.

New Electric Plane

A portable electric plane for both flat and edge planing is offered by Skil Corp., Inc., 5033 Elston Ave., Chicago 30, Ill.

Model 676 has a 3-inch width of cut, a depth capacity of ⅛ inch, and a lever that controls depth with accurate gradations at 1/64 inch. A deflector which may be directed to right or left keeps the work area chip-free. The cutter head travels at a speed of 13,500 rpm.



producing a surface that normally needs no sanding.

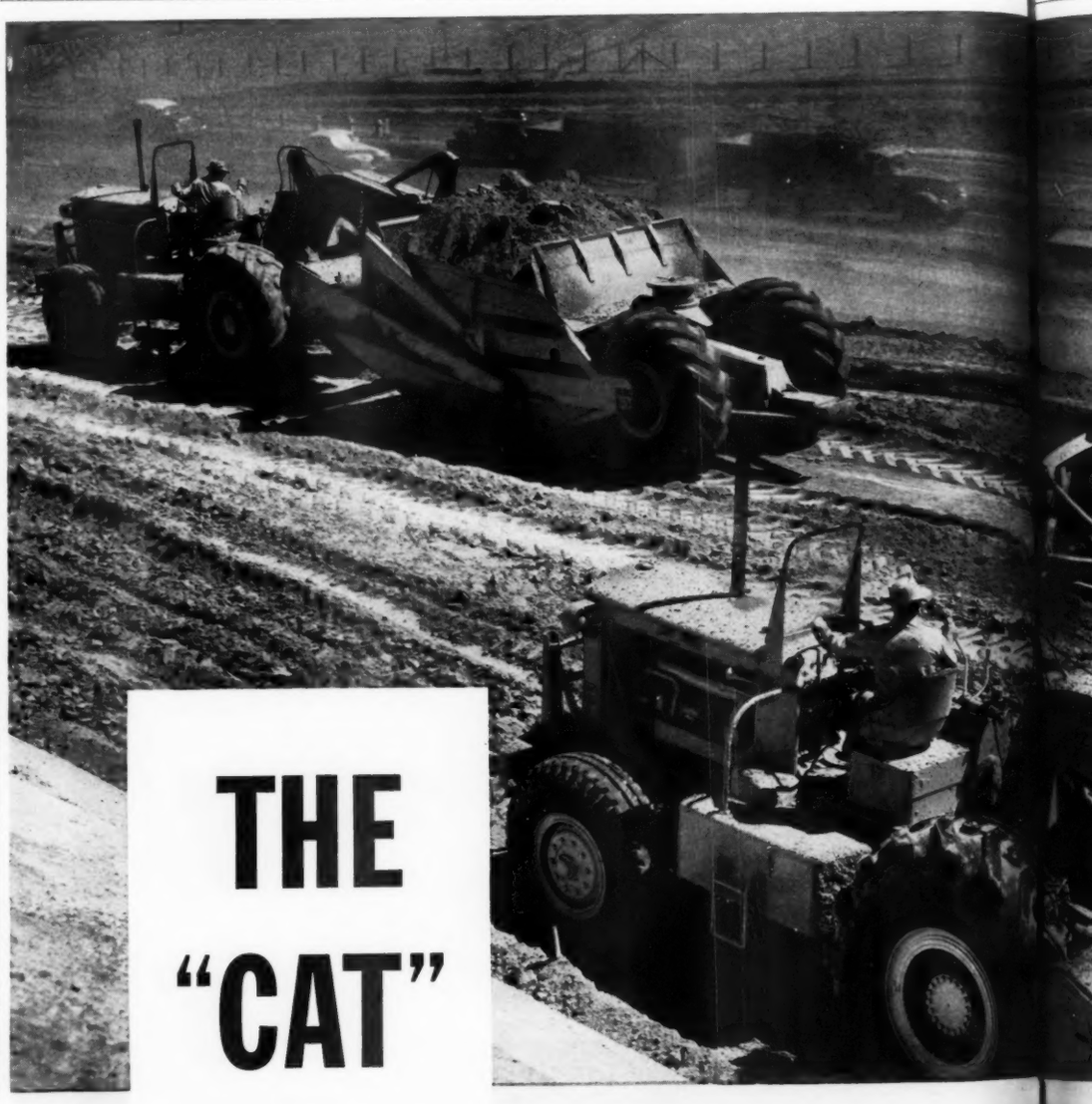
Even the hardest wood will not stall the motor, according to Skilsaw, because power is transmitted through a non-slip sprocket-type belt. For bevel adjustment, there are two wing nuts which may be loosened or tightened

Skilsaw's pla..e weighs 10½ pounds and includes a metal carrying case, a pair of steel-alloy blades, hex locking key, blade-honing bracket, and a blade-adjusting gage.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 948.

Walter Kidde Appoints V. P.

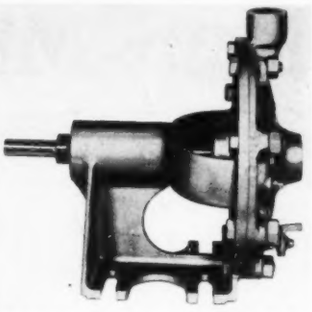
Taylor Milton has been appointed Vice President of Walter Kidde Constructors, Inc., New York, N. Y., engineer and builder. He will also continue in his present capacity as Vice President and Chief Engineer of Walter Kidde Engineer-Southwest, Inc., a subsidiary with headquarters in Houston, Texas.



A Reversible Pump

A new centrifugal pump which is said to operate with equal efficiency when rotated in either direction has been announced by Gardner-Denver Co., S. Front St., Quincy, Ill. The Model CAY was designed primarily for circulating cooling water in air compressors, diesel and gasoline engines, and other water-cooled machines.

Features claimed by the company include easy installation in any position on a machine, simplified pipe design, and adaptability to any type of drive. The Model CAY, the manufacturer states, has succesfully been installed on either side of the same machine without turning the pump around when moving it from one side to the other.



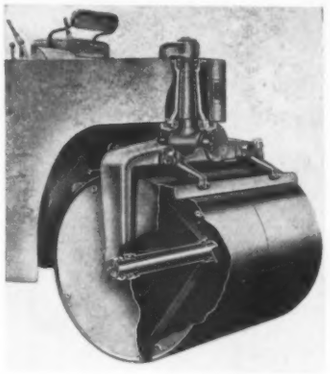
It is suitable for heads up to 50 feet and capacities up to 67 gpm. The pump is fitted with two prelubricated ball bearings, and has a mechanical seal that is said to eliminate stuffing-box leakage.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 862.

New Tandem Rollers

A new line of 8 to 12 and 10 to 14-ton tandem rollers has been put out by the Huber Manufacturing Co., Marion, Ohio. Power is transmitted through a Twin-Disc fluid coupling, and a choice of gasoline or diesel engines is available.

For field servicing, all vital parts are said to be readily accessible by means of adequate inspection plates and dust covers. Doors on either side of the engine can be taken off and locked on. The engine is also accessible from the rear, via a shield which encloses the rear of the frame in front of the guide roll. By loosening wing nut screws, the fan end of the engine is open for inspection. Roll scrapers are hand-adjustable, and all pressure grease fittings are within easy reach. The intermediate drive assembly is protected by an easily-removed housing.



The new tandem has a unit-welded frame, with additional lateral strength provided by crossmember channels, which also serve as the engine mountings.

Huber's yoke design makes it possible to adjust tapered roller bearings at the kingpin, the yoke swivel pin, and the roll axle, thus eliminating the scuff or rut on finish courses, caused when the guide roll lags as the tandem stops to reverse direction. Any looseness which develops can be corrected immediately, to prevent guide-roll yoke wobble.

Dual controls enable operation from either side of the unit. A variable-speed steering valve permits adjustment to any desired "feel" for hydraulic steering. The frame design and drive-roll mounting allows close curb clearance.

An Ausco Lambert disk brake mounted on the transmission countershaft exerts from 11,000 to 15,000 inch-pounds of braking pressure on its four faces, with equal braking power exerted in either direction of travel. The ventilating system draws air through a screened vent on top of the roller and passes it out through the sides and through the drive-roll well. Exhaust fumes are piped out of the guide-roll well at the bottom.

The 8 to 12-ton tandem drive roll has a compression of 278 pounds per linear inch and the 10 to 14-ton exerts 326 pounds per linear inch.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 922.

Data on Power Steer Booster

A 4-page folder on its Air-O-Matic power steer booster has been released by the Air-O-Matic Power Steer Corp., 24 Nobel Court, N. W., Cleveland 13, Ohio. The automatic compressed-air-operated booster is said to aid vehicle steering—from full load to no load—under all conditions. It is constructed mainly of anodized aluminum.

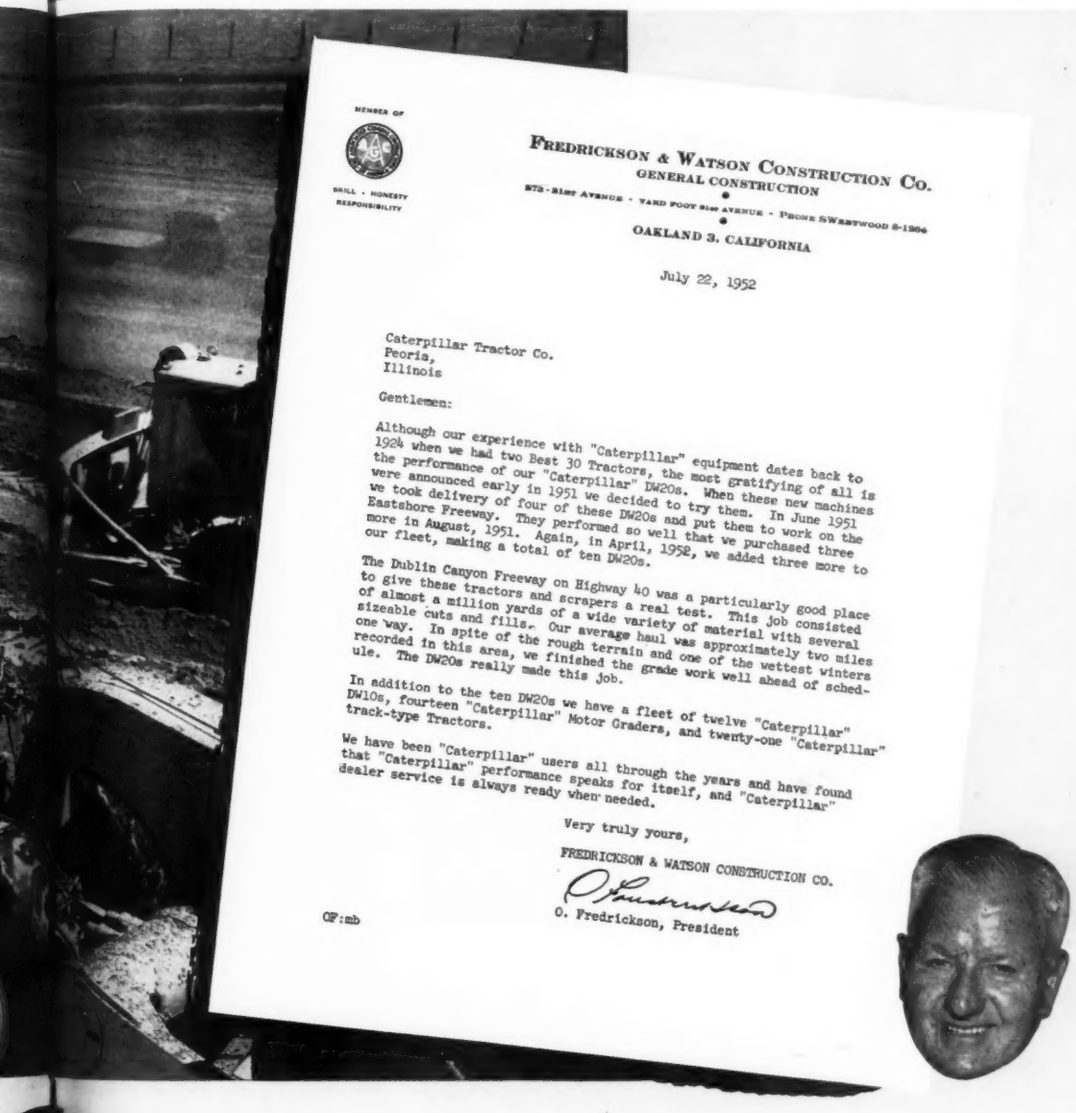
The catalog points out that the booster is easily installed; is rust and corrosion-resistant; can't jam or freeze; and requires no lubrication. The folder contains an installation diagram and specification tables.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 918.

Pipe-Lining Firm Appoints

A. J. Gates is the newly appointed Southwestern Representative of Pipe Linings, Inc., Los Angeles, Calif., a service organization for in-place concrete lining of pipelines. He will make his headquarters at Ruidoso, N. Mex.

Mr. Gates has had 25 years of experience in water-supply and distribution work, both ground and surface.


MEMBER OF
SKILL · HONESTY
RESPONSIBILITY
FREDRICKSON & WATSON CONSTRUCTION CO.
GENERAL CONSTRUCTION
873-81st AVENUE · YARD POST 81st AVENUE · PHONE SWERTWOOD 8-1304
OAKLAND 3, CALIFORNIA
July 22, 1952
Caterpillar Tractor Co.
Peoria,
Illinois
Gentlemen:
Although our experience with "Caterpillar" equipment dates back to 1924 when we had two Best 30 Tractors, the most gratifying of all is the performance of our "Caterpillar" DW20s. When these new machines were announced early in 1951 we decided to try them. In June 1951 we took delivery of four of these DW20s and put them to work on the Eastshore Freeway. They performed so well that we purchased three more in August, 1951. Again, in April, 1952, we added three more to our fleet, making a total of ten DW20s.
The Dublin Canyon Freeway on Highway 40 was a particularly good place to give these tractors and scrapers a real test. This job consisted of almost a million yards of a wide variety of material with several sizeable cuts and fills. Our average haul was approximately two miles one way. In spite of the rough terrain and one of the wettest winters recorded in this area, we finished the grade work well ahead of schedule. The DW20s really made this job.
In addition to the ten DW20s we have a fleet of twelve "Caterpillar" DW10s, fourteen "Caterpillar" Motor Graders, and twenty-one "Caterpillar" track-type Tractors.
We have been "Caterpillar" users all through the years and have found that "Caterpillar" performance speaks for itself, and "Caterpillar" dealer service is always ready when needed.
Very truly yours,
FREDRICKSON & WATSON CONSTRUCTION CO.
O. Fredrickson, President
OF:mb

JUNE, 1951
Fredrickson & Watson Construction Co. bought four "Cat" DW20 Tractors with No. 20 Scrapers. **4**

AUGUST, 1951
Fredrickson & Watson Construction Co., satisfied with their first four, bought three more. **3**

APRIL, 1952
Fredrickson & Watson Construction Co., satisfied with their first seven, bought three more. **3**

TOTAL **10**

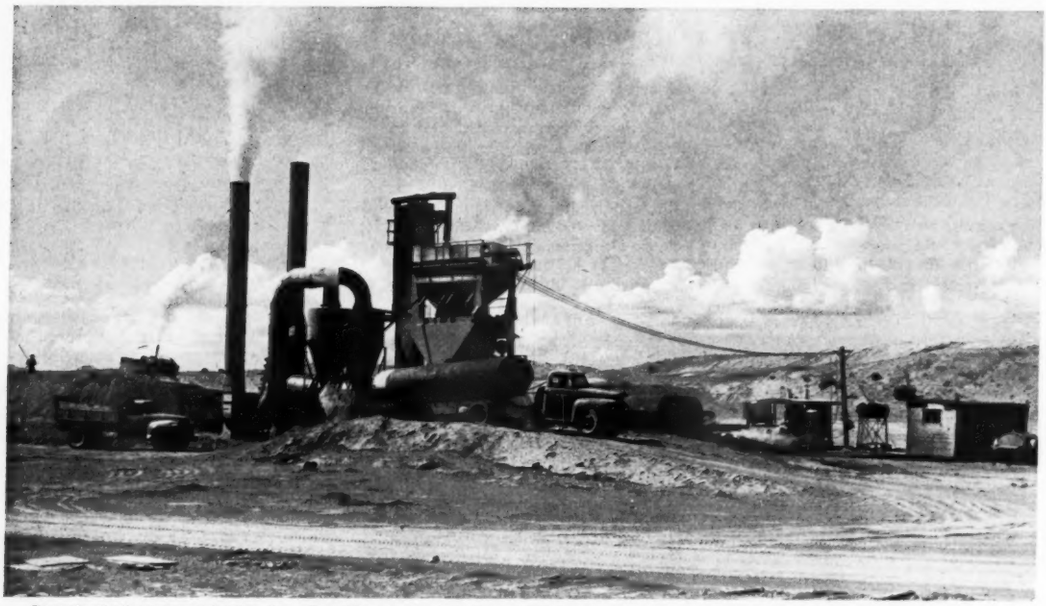
This is the repeat-purchase record of one company. It is typical of countless more. It will pay you to see your "Caterpillar" Dealer now.

CATERPILLAR, PEORIA, ILLINOIS

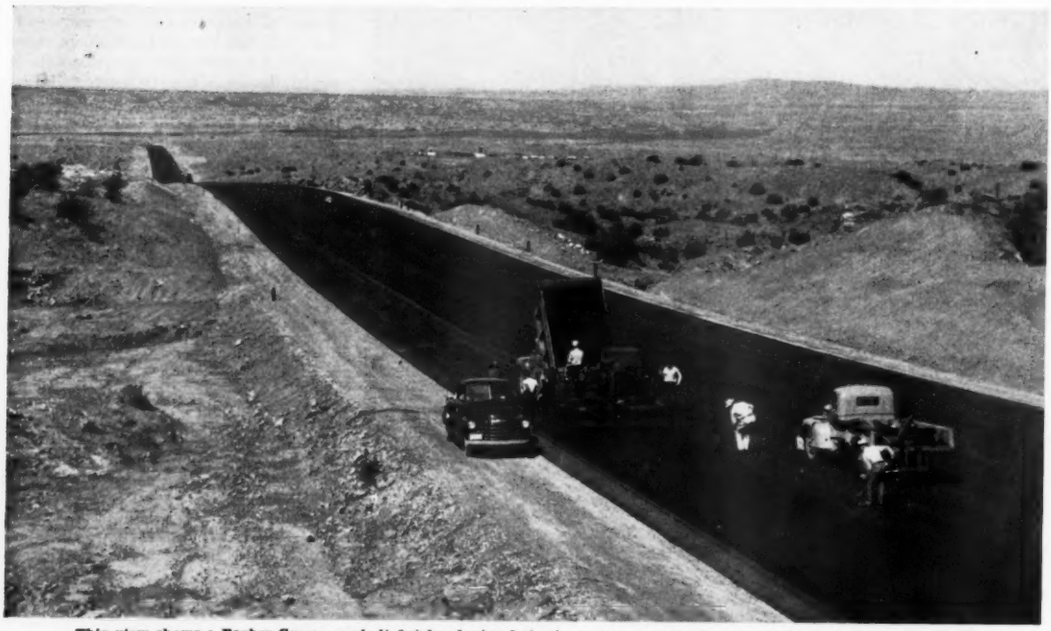
CATERPILLAR
REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Four Miles in Four Months!



In a cloud of smoke against a clean New Mexico sky, this Model SM Standard asphalt plant mixed all the pavement for the job.



This view shows a Barber-Greene asphalt finisher laying hot-mix on the new La Bajada grade, near Santa Fe, N. M.

Final compaction is done by a Buffalo-Springfield 10 to 12-ton tandem roller.

Hilly Section Is Rebuilt to Four-Lane Standards as New Mexico Contractor Shows Remarkable Speed

By RAY DAY

(*Photo on page 1*)

• ON U. S. 85, just 19 miles south of New Mexico's capital city of Santa Fe, one of the most remarkable pieces of speedy roadbuilding ever done in the state was recently accomplished. When the final inspection was made, it meant that almost 4 miles of the dangerous old La Bajada grade had been reconstructed to 4-lane standards in only 4 months.

Brown Contracting Co., Albuquerque, N. Mex., was the contractor who pushed the $600,000 New Mexico State Highway Commission contract so successfully, in spite of everything from malapai boulders, red sandstone, and conglomerate, to heavy traffic. The latter, which had to be maintained through the job on an oiled surface, was one of the most troublesome problems of all. The speed of construction was all the more remarkable when one considers that the contract called for grading, drainage, preparation, and installation of a granular subbase, and the preparation and installation of hot-mix asphalt pavement. Engineers and people otherwise concerned about the time element in general highway construction are looking at the La Bajada job with interest.

Project Need is Great

The need for reconstruction of the steep mountain grade at La Bajada had been great for several years. U. S. 85 through this part of New Mexico was a well maintained but generally narrow road, with a low-type asphalt surface sealed with more asphalt and chips. During the past few years, this highway has attracted as much heavy traffic as U. S. 66, the state's main east-west arterial. Possibly the establishment of the atomic center at Los Alamos and Sante Fe has had something to do with the increasing traffic. In addition, each summer season is producing a heavier tourist-traffic count.

The mixture of light and heavy vehicles on the mountainous grade produced the expected dangerous conditions on the old road, so the State Highway Commission decided to solve the muddle for quite a few years to come by rebuilding the old road completely from the top of the grade well down toward the beginning of the high flatlands which lead toward Bernalillo and Albuquerque. The project was financed with Federal Aid.

Design Standards

There are 30 stations of modern divided-highway construction in the project, along with 155 stations of 83-foot 4-lane roadbed. The divided section has a built-in 30-foot median strip, while the standard 4-lane section has only a 5-foot asphalt divider to separate opposing flows of traffic. However, excavation types and quantities were so discouraging through this grade section that the laws of economics had, to a large extent, to govern the design of the new highway's width.

Each of the two roadways consists of a 24-foot asphaltic pavement, merging gently into 4 feet of asphalt and 10 feet of sealed granular shoulder. Subgrade densities are designed for a minimum of 90 per cent, and there is a granular base-course overlay on top of the subgrade. Depth of this base course varies from 6 to 15 inches, depending

on the type of soil underlay. In all rock cuts an extra 12 inches of granular base is provided, over and above the design figures.

The hot-mix pavement consists of 1½ inches of asphalt-process leveling course, laid as a base; and 1½ inches of hot-plant asphaltic pavement, laid as a surface or riding course. This pavement is designed for a minimum Marshall stability of 1,500 pounds. Details of both mixes will be given later in this article.

One of the interesting practical features connected with the engineering planning of this pavement was the use of rubber-tire rollers, in addition to the usual steel-wheel machines, to give a better riding surface, better density, and a finer surface texture. This special rolling was sandwiched in between the initial and final steel-wheel passes.

Grading Starts — With Powder

A sizable 278,000-cubic-yard grading job, which had been bid unclassified, had to be disposed of before very much work could be done either on the granular base or the asphalt pavement. The Brown organization is an alert outfit, however, so no one was caught unprepared when about 50 per cent of the unclassified material turned out to be red sandstone, a conglomerate, and malapai rock, the latter about the hardest there is in North America. The remainder of the material was a mixture of clay, dirt, and gravel.

With the exception of short stretches of new construction necessary to get rid of a few bad reverse curves, the general alignment was sufficiently straight to be permanent. Since traffic had to be maintained through the job at all times, it meant that the cars had to flow through an active construction job about 90 per cent of the time. Flagmen were employed. Crews worked slowly and carefully, in spite of the general showing of speed, to hack out the necessary path for the wider highway. The proximity of traffic to these operations was the No. 1 headache.

Very little clearing was involved, because the La Bajada grade drops down off the edge of a high eroded lava flow and leads through vast rock beds to lower country. Drilling crews moved in to start the job in April. Two 350-cfm compressors, an Ingersoll-Rand and a Gardner-Denver, came in. So did a 500-cfm oil-controlled mobile unit, Ingersoll-Rand's latest model. There were two Ingersoll-Rand wagon drills and 6 Jackhammers with these compressors. Some of the rock cuts were deep enough so that 24-foot steel was necessary. Ordinary detachable rock bits were successfully used to sink the holes.

Each rock formation drilled and reacted differently to powder. Malapai drilled hard but cracked like brittle glass. Sandstone drilled more easily, but the explosive force of powder often dissipated itself in seams of this material. Conglomerate drilled and shot hard. No hard-and-fast rules of hole centering or loading were possible. While the project is about 150 miles east of the Continental Divide, the rock formations turned out to be the usual geological hodgepodge of tough digging and shooting characteristic of the Rockies all along the high western backbone of America. Drillers and powdermen felt their way along, and made their share of good guesses how the various types of material would act. There was very little springing done, and most of the holes were barrel or column-loaded.

Smooth riding in the future depends on Clyde Fulton, laydown foreman, and Barber-Greene operator Ed Cole.

Rock loading was done by a Lima 2½-yard shovel, which mucked the broken rock to 5 Koehring Dumptors, especially good for short-haul work. Broken rock which had to travel longer distances was successfully moved by two 21-yard Euclid scrapers. Much cleanup, pioneer, and pusher work was done by D8 Caterpillar and Allis-Chalmers HD-20 tractors, equipped with dozer blades.

As a rule, broken rock was deposited in the deep parts of fills, where it would lend stability to the finished embankment. A dozer was used to level the material out after it was dumped by the Euclids and Dumptors.

For grading in softer ground which would load without any shooting, a fleet of five LeTourneau Carryalls saw service. These machines were towed either by D8's or HD-20's, and push-loaded in most cases. Carryalls worked where haul distances were not above 1,500 feet.

Fortunately for the contractor's crews, last winter was wet enough to leave considerable moisture in the ground. A water haul of about 20 miles, all the way from Santa Fe, was necessary when moisture was needed. The subgrade material was heavily processed by Gebhard sheepsfoot roller units, and also was rolled by the passage of tires on the earthmoving equipment. The finished grade was hard and dense. It was carefully dressed by a Caterpillar 12 motor grader, working to precise grade stakes, because the smoothness of subbase and pavement courses depends to a great extent, many western road builders feel, on the smoothness of the earth grade underneath.

Crusher Setup Made

The granular-base portion of the

(Continued on next page)

BIG Tractor-shovel with BIG push

4-wheel drive PAYLOADER®

Contractors and Public Works men are happy with the big Model HM 1½ yd. "PAYLOADER" because of the combination of power, mobility and versatility it gives them — power and 4-wheel traction to get *big* production even when ground conditions are poor . . . mobility to get from job to job quickly at speeds up to 16 m.p.h. . . . versatility to dig, load, grade, bulldoze, spread, pull and push . . . to work on or off pavement.

This tractor-shovel also makes a hit with operators because it rides easy and has a big comfortable seat, power-boosted steering and fingertip hydraulic control.

Four speeds *reverse* as well as forward permit as fast operation in both directions as the job conditions allow, and there's a choice of gasoline or diesel power. Once you've seen a Model HM in action you'll understand why hundreds of owners and operators are its enthusiastic boosters.

The Frank G. Hough Co., 762 Sunnyside Ave., Libertyville, Ill.

WRITE for catalog on the 1½ yd. Model HM or the six other "PAYLOADER" sizes down to 12 cu. ft. bucket capacity.

SAY "HUFF"
PAYLOADER®
THE FRANK G. HOUGH CO. • Since 1920

ROETH

CONCRETE VIBRATORS
MOUNTED ON WHEELBARROW CHASSIS
Write for details and prices
ROETH VIBRATOR CO
1737 Farragut Ave., Chicago 40, Ill.

Four Miles of Road Rebuilt in Four Months

(Continued from preceding page)

project called for the preparation of 58,000 cubic yards of 3-inch-minus base course and 24,000 tons of ¾-inch minus leveling-course material. An excellent pit was located by preliminary state investigation within a ¾-mile dead haul of the south end of the job, and one setup of both the crushing-screening and asphalt plants was sufficient to complete the work. However, this setup made it necessary to haul everything uphill.

A Cedarapids Master Tandem portable plant was used to crush and size granular base material. Later on, it also produced the fine ¾-inch-minus mineral aggregate for the hot-mix. The pit was a dandy: it contained a minimum of oversize hard boulders which would be tough on the crushers and screens, and the native fines were generally within acceptable limits. In addition, there was just enough fine white caliche in the pit to enchance a cementing action when the granular base was laid, and finished shoulders, for example, were hard and durable.

The Master Tandem plant was so arranged that a U-type dozer on a D8 Cat could feed the trap by gravity, after shoving the raw material only 350 feet at the most. In traveling through the plant, this raw material dropped through the trap to a 30-inch delivery conveyor by means of an endless chain feeder, with a controlled gate opening. The 30-inch delivery belt put the material out on a double-deck 4 x 12 set of screens, which passed the acceptable material immediately to a storage bin holding about 25 tons.

Oversize material remaining on the top-screen deck was generally large material, so it was routed to a 20 x 36 jaw crusher. The jaw was arranged in closed circuit with the upper-screen deck, so any throughs still not acceptable would again pass through the jaw for further reduction. Oversize material on the bottom-screen deck passed to a 40 x 22 roll crusher, which was also arranged in closed circuit so the unreduced material could be rerouted. The entire plant was driven by a Caterpillar D17000 diesel engine.

When this plant was producing 3-inch-minus material for the granular subbase, tonnages up to 400 an hour were not uncommon. On ¾-inch material, where a considerable amount of tough crushing was called for, the machine produced an average of 180 tons an hour.

As the Master Tandem plant produced granular-subbase material, it was stored temporarily in a 25-ton surge bin, at the end of the delivery conveyor. A fleet of rented dump trucks hauled the material away from this point and delivered it to the highway, where it was spread in the proper-sized windrow. After being blade-mixed by motor patrols to blend the material and eliminate any segregation, water was added and the material was further mixed. When a good blend of moisture and particle size had been made, the material was laid down in approximate 3-inch lifts, and heavily rolled by a pair of Timco and Tampo rubber-tire rollers, pulled by an I-6 International wheeled tractor. Excellent densities were made, and later on, after the fine caliche had a chance to cement the rock particles together, an unusually good base had been built.

The rock plant also produced the mineral aggregate for the hot-mix from the same pit. Specifications for the mineral filler were naturally more precise, so greater care had to be exercised in sampling the material and operating the plant. Finished material went out to the same surge bin, and was trucked about 1,500 feet to the site where the asphalt plant was set up.

Mix Made From Plant Setup

To an average motorist, no highway is any more than surface deep, because that tells him how well it rides. For that reason, the asphaltic-concrete pavement which was laid on La Bajada grade was especially interesting, because an excellent mix was obtained and the finished job was checked out as one of the smoothest laid in New Mexico since Tijeras Canyon was finished on U. S. 66.

The hot-mix was made about ¾ mile from the south end of the project by a Standard SM 4,000-pound asphalt batch plant, set up in the middle of a large level area with room to spare. Separate stockpiles were used over a common feeder tunnel for the two asphalt courses, which were blended to different specifications according to standard New Mexico highway specifications.

Later on, when the surface stockpile became slightly deficient in some of the larger sizes of rock, this material was added through another gate in the tunnel.

Specifications for the two mixes, together with other special data were:

For Base or Asphalt-Process Leveling Course:

Size Screen	Job-Mix Target Per Cent Passing	Specification Tolerances Per Cent Passing
¼-inch	100	100
½-inch	93	88-98
⅜-inch	88	83-93
No. 4	73	68-78
No. 10	54	50-58
No. 40	32	28-36
No. 80	20	17-23
No. 100	9	7-10

Asphalt, 85-100 penetration	6.75 per cent
Rock temperature	240-280 degrees F
Asphalt temperature	250-280 degrees F
Mix temperature	240-270 degrees F
Mixing time	45 seconds

For Top Course, or Hot-Plant Asphaltic Pavement:

Size Screen	Job-Mix Target Per Cent Passing	Specification Tolerances Per Cent Passing
¼-inch	100	100
½-inch	86	81-91
⅜-inch	75	70-80
No. 4	55	50-60
No. 10	41	37-45
No. 40	21	17-25
No. 80	15	12-18
No. 200	8	6-10

Asphalt, 85-100 penetration 6.35 per cent
Rock temperature, asphalt and mix temperatures, and mixing time, same as base course.

A field laboratory maintained by the State Highway Commission was set up on the site. This laboratory was charged with responsibility for making sieve

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You can mount the new TL-10 on your truck—new or used—and get all the advantages of high-speed mobility. Or, you can mount it on barge, pier, dock, bin, etc., to lift or load faster — anywhere. You get big machine quality at big dollar savings.

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The new Lorain "baby" is a "chip-off-the-old-block". It has the famous Lorain "TL" quality — and fast, smooth operation. And it is an off-spring of the world's first truck crane built by Thew-Lorain more than 30 years ago. The new TL-10 has a pedigree you can bank on!

THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN®

analyses, sampling materials, running Marshall stability tests, and making extraction tests for asphalt percentage in the mix. P. R. Sandoval, who was in charge of this field work for the State, also instituted a running record of unusual things connected with the laydown of the mix. Anything which seemed to Sandoval to deviate the least bit from normal, he noted in this log. If future maintenance trouble should develop, for example, it can be checked against this log to see if there was something unusual when the material was placed. It may well be the start of some valuable practical information for future road building.

Good Asphalt Arrangement

A heads-up arrangement was used on asphalt. The 85-100 penetration material was shipped by rail from Kansas and Oklahoma refineries, and was handled by truck from a rail siding at Santa Domingo, about 3½ miles from the hot plant. At the rail siding there were two Grace tank-car heaters for bringing the material up to application temperature.

One truck driver was used with two 2,600-gallon Ford-drawn asphalt trailers. While the driver loaded one trailer with asphalt at the rail siding, the other loaded trailer stood at the plant, dumping its load by gravity into the twin 12,000-gallon horizontal storage tanks. When the driver arrived with the loaded trailer at the plant, he simply spotted it where the now empty trailer was standing, and drove the empty to the railhead for another load.

A 3-inch electric-driven Viking pump circulated the asphalt from storage to the hot pot at the plant. Yale dial scales measured weights of both asphalt and mineral aggregate. The mineral aggregate was passed through a 6 x 24 dryer before it was raised by an enclosed hot elevator to the top of the plant, where it was screened and sized before passing into the various bins. The La Bajada mix was a 3-bin pull. Each truckload of hot-mix leaving the plant contained four 4,000-pound batches, along with about 250 pounds of asphalt in addition to the basic 4,000 pounds of aggregate. The trucks were weighed on a field scale, and a record was made of material delivered to the job by means of scale tickets, given to the drivers.

The hot plant had some modern auxiliary equipment, including a 125-hp Cleaver-Brooks automatic steam generator, and a Caterpillar D375 diesel-electric generating unit. The steam generator furnished all steam for heating the asphalt tanks, atomizing the dryer fuel, and heating the 12,000-gallon No. 6 fuel tank which fed the dryer burner. It also operated the pugmill-gate rams. The Cleaver-Brooks machine burned diesel fuel.

On the La Bajada setup, the complete dust-collection system of the Standard plant was used, and the fines were returned to the mix.

The hot plant could be demobilized and on its way to another job in only 48 hours, so well had the dismantling and assembly schedule been set up. A dozen trailer loads took the plant, provided a bit of juggling of extra pieces was done. It took one trailer to haul the Cat D375 diesel-electric unit and a few small items like its control switchboard. The Cleaver-Brooks boiler and attachments took up two trailer loads, and the diesel-fuel tanks could be squeezed in here. Two more trailer loads took the two trap sections, cold elevator, and stack.

Each of the three 12,000-gallon storage tanks was a load in itself. The dust-collection system made two trailer loads. The screening system and bin compartments made up one load, as did the 6 x 24-foot dryer. A final load consisting of the pugmill, control panel and legs, completed a move. Setups were standardized as much as possible according to a schedule which promoted the best efficiency for operator, truck drivers, and material deliveries.

Six days a week, 8 hours a day, the plant delivered a batch of mixed material every 53 seconds, with little down time. On the longest haul, 11 batch trucks were used. On the end nearest the plant, 5 trucks hauled the material away.

Paving

The hot-mixed asphalt was all laid by a Barber-Greene finisher, working in 11-11-10-11-11-foot lanes. Occasionally, other combinations also had to be used, but width of 10 and 12 feet covered the pavement width nicely. The usual string lines, set to survey marks, were used to keep the machine on line.

The surface of the granular-subbase course had, of course, been primed with an application of 0.3 gallon of MC-1 per square yard, applied well ahead of paving. In many cases this primed surface was available to traffic. With only a 4-man crew at the laydown machine, the entire plant output was handled without delay.

Rolling of each lift was done first by a Buffalo-Springfield 10 to 12-ton tandem breakdown machine, followed by heavy rolling with the International I-6-drawn Timco and Tampo pneumatic rollers. Final rolling was done by another 10 to 12-ton Buffalo-Springfield tandem. Densities of from 94 to 96 per cent of laboratory predictions were made in the field. These were often checked by circular steel rings set ahead of the laydown machine, rolled, and recovered after the field work was done.

The finished pavement has a roughness factor estimated to be less than 50 inches per mile. It rides beautifully, and has a pleasing appearance of safety. According to project officials, the practice of laying the top course only a half day's run, then moving the Barber-Greene machine back by trailer and bringing up the next lane while the joint was still warm has added smoothness and a tight texture to the new 4-lane blacktop pavement.

Personnel

The project was directed under the general supervision of C. O. Erwin, State Highway Engineer, with T. W. White as Construction Engineer, and Ben Trujillo as Project Engineer.

Contract operations, which blazed along at fireball speed to finish this sizable job in only 4 months, were directed by LeRoy Evans, General Superintendent. Voyd Stewart and Tom Lowance were Excavation Foremen. Ed Cole was the head operator on the laydown machine, and the laydown crew was under the supervision of Clyde Fulton. Lee Irwin was the superintendent of the hot plant.

The rapid completion of this important project adds another 4 miles of modern 4-lane and divided highway to the mileage of that type of thoroughfare which New Mexico, like other states, is finding more and more necessary to solve her growing traffic problem.

"OPERATION EARTHMOVING" — another tough job that demands AMERICAN BOSCH performance

Dams, airports, super-highways . . . when contractors set out to move dirt, they really give Mother Earth a face lifting. And when projects involve millions of cubic yards of earth, giant trucks and earthmovers shoulder heavy loads . . . help meet tight schedules.

American Bosch products contribute to the dependable, economical, efficient performance of both Diesel and gasoline powered equipment. On Diesels, American Bosch supplies one of the most vital elements for reliable operation—the fuel injection system. And American Bosch electrical equipment—heavy duty generators, voltage regulators and magnetos—has long been a symbol of dependability in construction, as well as many other fields.

Today's American Bosch fuel injection equipment is the result of nearly two million man-hours of research and engineering. Combined with rigid standards of precision manufacture and skilled service, such thorough developmental work indicates why American Bosch products are held in such high regard in the automotive, aviation and Diesel fields. American Bosch Corporation, Springfield 7, Massachusetts.

AMERICAN BOSCH

A ⅜-Yard Excavator

A new ⅜-yard excavator convertible to crane, dragline, shovel, and trench hoe is announced by Sargent Engineering Inc., Fort Dodge, Iowa. The Model 38 features a dust-tight ball-bearing circle. The company claims that a fingertip push on the cab will rotate the deck.

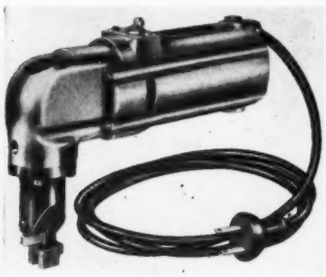
The molded Plexiglas front cab window provides full vision for the operator. The entire sloping hood to the left of the operator hinges at the bottom, permitting the hood to swing forward and give access to the machinery.

The machinery frame is heavy weldment with a maximum depth of 28 inches. The drag and hoist drums and the miter gears are all set on ball bearings.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 935.

Heavy-Duty Nibbler

A new portable nibbler for cutting through 14-gage stainless steel, CR steel, galvanized iron, and softer materials without distortion on either side has been developed by Fenway Machine Sales Co., Inc., 20 S. 15th St., Philadelphia 2, Pa. The Little Wonder also cuts holes in tubes and ducts without damaging the original contour. The nibbler is accurate, and can be used as a hand tool or easily mounted in a vise for bench operations, the company points out. Minimum cutting radius is ⅞ inch.



The Little Wonder has an aluminum casting and weighs 7½ pounds. It is 10 inches long, and comes with a Universal motor and a 3-conductor 8-foot rubber cord and connections. Antifriction bearings are on all rotating parts.

Further information may be secured from the company. Or use the Request Card that is bound in at page 18. Circle No. 882.

Safety Traffic Lanes Will Be Heard and Seen

Motorists traveling on the proposed 165-mile Garden State Parkway from Bergen County to Cape May, N. J., will hear as well as see the edge of the driving surface. Both sides of the highway will have 3-foot strips of white concrete which will make a loud humming noise when the tires of a vehicle run on them.

The concrete strip, fitted flush with the pavement, will have a series of corrugated surfaces which are molded into the freshly-poured concrete with special tools. These surfaces, besides transmitting vibrations through the vehicle's tires and body to create the humming noise, will also reflect vividly both day and night, and especially well in the rain.

The idea of corrugated concrete originated as a visual device. It had been noted that flat surfaces were not good reflectors unless at right angles to the motorist's vision. With this in mind, engineers designed curbs with a series of small raised surfaces that reflected the beams of the headlights back to the driver at night. The technique was later used to replace the usual white line as a dual-lane marker.

Since 1943, New Jersey Route 6 has been the experimental field for the audio-visual warning. The medial line met with such success that the humming concrete was perfected for use as a border on the new Parkway, which will be completed within the next three years.

The Sargent Model 38 excavator is convertible to various types of equipment.

Catalog on Forming System

A 44-page catalog on its system of wall-form construction has been prepared by Symons Clamp & Mfg. Co., 4291 Diversey Ave., Chicago 39, Ill. It contains all of the latest information and improvements in the forming system, and explains how it operates.

The catalog illustrates the forms in use on construction jobs. It contains blueprint illustrations and complete specifications, including material and equipment necessary, time required, and cost figures on actual jobs. The catalog also gives detailed information on Symons safety shores and column clamps.

This literature may be obtained from the company, or by using the Request Card that is bound in at page 18. Circle No. 908.

When competition threatens...

that Pioneer Edge

Why Vaughan & Moon can sell gravel for less

● Vaughan & Moon, Arlington, Virginia, went shopping. They wanted to get the jump on their competition in the important Washington, D.C.—Arlington gravel market. One way suggested itself . . . eliminate expensive truck loading by moving an efficient portable plant directly to the source of the material.

After careful study, these shrewd gravel producers chose a PIONEER 18V plant for the job. They reasoned that PIONEER'S famous Bottom Deck Feed, swivel feed conveyor, method of transfer between return conveyors, and simplicity of drives, offered the extra efficiency they sought.

Today, this little plant is a busy one. Located near Bailey's Cross Roads on Columbia Pike in Arlington County, Virginia, (only 15 minutes from downtown Washington) it's turning out 90-100 t.p.h. of 1¼" minus material with 50% crushing The Arlington County Bureau of Public Roads is an important customer

Did this plant live up to expectations? "It's even better than we hoped", says Clarence Vaughan . . . another skilled operator who has found the way to overcome competition.

BUY BOTH!
HIGHER OUTPUT
LOWER UPKEEP

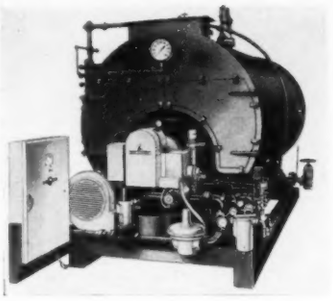
Pioneer
Continuflo EQUIPMENT

Boiler-Burner Units

A complete new line of boiler-burner units has been jointly announced by Kewanee-Ross Corp., Kewanee, Ill., and the Iron Fireman Mfg. Co., Cleveland 11, Ohio.

Each unit consists of an Iron Fireman packaged burner complete with all controls and a Kewanee Scotch boiler, completely assembled with its accessory equipment for oil, or oil and gas, or gas firing.

The boiler-burner units are available for high-pressure steam and water in sizes ranging from 52 to 304 hp, 125 and 150 pounds working pressure; also for low-pressure 15 pounds steam or 30 pounds water, in sizes from 1,313,000 Btu to 10,700,000 Btu. They may be fired with No. 6 or lighter fuel oils, gas (either high-pressure or as low as 2



ounces), or a combination of both fuels.

The units are designed for forced-draft operation, eliminating the necessity of a high stack. Provision need only be made for a short stack extending above the roof. Complete specifications will soon be available for selecting the exact type and size of combination unit for any application.

Further information may be secured from the company. Or use the Request Card that is bound in at page 18. Circle No. 906.

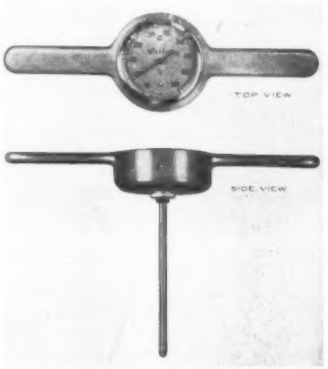
Be Your Own Weather Man

A handy pocket-size weather guide is offered by The Galion Iron Works & Mfg. Co., Galion, Ohio. It contains sixteen four-color photos of different types of skies, with simple explanations of the weather they foretell. A section on thunderstorms tells what to do if you are caught in one.

This literature may be obtained from the company, or by using the Request Card that is bound in at page 18. Circle No. 929.

Thermometer Checks Asphalt Temperature

A new stainless-steel thermometer for checking the temperature of hot asphalt is announced by W. C. Dillon & Co., Inc., 1421 S. Circle Ave., Forest Park, Ill.



The Model R has a 3-inch dial, a 9-inch stem, and records temperatures between 50 and 500 degrees. The company points out that the unit is accurate to one per cent of the full scale reading. It is also said to be anti-corrosive, moisture-proof, and protected from overheating.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 865.

Design of RC Buildings

A textbook on the design of reinforced-concrete buildings has been published in England by Concrete Publications, Ltd., London. "Examples of the Design of Reinforced Concrete Buildings", by Chas. E. Reynolds, is a successor to the same author's "Practical Examples of Reinforced Concrete Design". The present book gives examples of the calculations and drawings required for reinforced-concrete buildings, based on the British Standard Code of Practice No. 114 and its subcodes, and is in accordance with a recent revision on loading. Design of beam-and-slab and flat-slab structures is shown, and the author comments on the application of the codes of practice.

The book contains tables and graphs which summarize the requirements of the codes and permit of rapid assessment of bending moments in continuous beams, shearing resistance of groups of bars, and allowable loads on concentrically and eccentrically loaded columns. Many other tables and graphs are included with the object of reducing labor in the design of reinforced-concrete structures.

"Examples of the Design of Reinforced Concrete Buildings" is available by writing to Concrete Publications, Ltd., 14 Dartmouth Street, Westminster, London, S. W. 1, England. The price, including postage, is $2.40.

Bunnell-Ludwig Corp. Formed

Geo. E. Bunnell, Inc., one of Florida's oldest construction companies, has become Bunnell-Ludwig Corp., with unchanged headquarters at 15151 W. Dixie Highway, North Miami, Fla. Robert M. Ludwig, who bought 50 per cent of the company's capital stock, continues as President of the company, with George A. Bunnell, son of the founder, Executive Vice President.

Though the firm specializes in marine construction, it also handles bridgework, state-highway construction, and special projects such as the redemption of wasteland for development through construction of seawalls and providing fill.

Ludwig-Bunnell Industries, Inc., a company that rents heavy equipment to contractors, and Ludwig-Bunnell Pools, Inc., specializer in building swimming pools, are subsidiaries of the new corporation.

tips the balance

How Bottom Deck Feed Boosts Production

First: By an ingenious method of feeding and routing material, Bottom Deck Feed provides twice the *effective* screening area of ordinary plants. This makes it possible to handle a considerably greater screening load without loss in efficiency.

Second: A quick, simple adjustment of the jaw crusher makes it possible to balance the load between the two crushers while the plant is in full operation, without changing screens. When material in the pit runs coarse, open the jaw and let the roll crusher do more of the work. When pit material is running fine, close the jaw until it does its full share. Result: both crushers are kept busy . . . and your plant operates at peak efficiency at all times.

There's a Pioneer Portable Plant for every job

Whatever your requirement, there's a PIONEER Portable Plant that will do the job. Duplex plants are now available in seven different sizes, ranging all the way from the little 17V (and 18V shown above), to the big 46VE, with Diesel Electric Drive. All feature the exclusive PIONEER principle of Bottom Deck Feed . . . all offer the famous PIONEER EDGE in performance.

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Rubber-Tired Rigs Speed RR Grading

Mile-and-a-Half Hauls Feature 7,000,000-Yard Job Over Difficult Iowa Terrain for Track Relocation

By L. H. HOUCK

A Model C Tournapull with 22.7-yard struck capacity is push-loaded by an International TD-24 while a second TD-24 waits in the back for the next scraper.

• "STRICTLY a rubber-tired job" was the way Harold Fredrickson, General Superintendent for the Ace Construction Co., Omaha, Nebr., described the grading on the 33.66-mile track relocation of the Chicago, Rock Island and Pacific Railroad Co. between Atlantic and Council Bluffs, Iowa.

"The grade is figured for all the cut dirt to go in the fills", Fredrickson said. "There are no borrow pits and no spoil piles. Our hauls run from 1,800 feet to 8,000 feet—about 1¾ miles—and we'll probably average almost 4,000 feet. With such long runs our scrapers and wagons have to fly."

There is one 1,000,000-yard fill and the haul on that section is 1½ miles. This embankment will be 45 feet high when completed and topped off for track ballast. At the rate Ace is going, 2,000 yards has to be moved every hour. If a scraper or a wagon is down for five minutes, 166 cubic yards of dirt is lost.

Fredrickson drives over the job in a 1952 blue Ford sedan. There is a saying that if you can't find Fredrickson, just stop a scoop and then rush up on top of the nearest elevation. That blue speck coming hell-bent for leather in a cloud of dust will be Fredrickson.

Excavation for the entire 33.66 miles amounts to 7,000,000 cubic yards. The excavation for the 13-mile section from Graybill Creek to Middle Silver Creek on which the company was working in July amounts to slightly less than 3,000,000 yards, and when CONTRACTORS AND ENGINEERS MONTHLY visited the job in the middle of July, 1,000,000 yards had been moved.

The grading contract represents a pooling of forces and equipment by two well known construction companies—Ace Construction Co., of Omaha, Nebr., and Eblen Construction Co., Atlantic, Iowa. They received the grading contract for the entire track relocation under the title of Ace-Eblen Construction Co., Co-Adventurers.

The new track right-of-way cuts through land which has been farmed and pastured since the time of the Indians. Geologists say this is old land—at least 200,000,000 years old. Some of the cuts are 50 to 60 feet deep, many of them are 40, and the big fill contains almost 1,000,000 yards—1,000,000 yards of scrambled history.

While no one will deny that it is strictly a rubber-tired high-speed job from the standpoint of long hauls, digging this dirt is no child's play. In fact it is possible to dig all day and still not have enough yardage to write home about, because the stuff is unpredictable and tricky.

Missouri Valley Formation

Experience in recognizing the various kinds of material found in this particular section of the country is an invaluable asset. Fredrickson has been in this land of blue glacial clay and quicksand before, and here it can be proved that absence of hard-rock excavation is not always a blessing. For instance, in a strip from 20 to 50 miles east of the Missouri River there were once prehistoric swamps, ancient riverbeds, and sinkholes. These filled up from prehistoric floods when the 20-foot ground sloth roamed these prairies with the 12-foot armadillo.

Some of the formation is loess, unstratified deposits of loam ranging from clay at one extreme to sand at the other and yellow buff in color. Geologists say this was blown over this part of the country by gigantic dust storms that came after the glaciers melted and that some of it drifted to 70-foot depths. Other later deposits were clearly strati-

"We've Used Cedarapids

Look AT THESE JOB RECORDS OF JUST TWO OF LARSON'S PLANTS

This Cedarapids Junior Tandem, which was new in 1949, is operating at Cortland, Illinois. With 30% crushing, its average output is 150 tons per hour, producing 1" minus concrete aggregate, ⅜" washed pea gravel and sand. All of the material goes through the Cedarapids Portable Washing Plant shown in the photo above, which includes a triple deck Cedarapids Horizontal Vibrating Screen and a Screw Washer. The Junior Tandem is also producing some material for a Cedarapids Patchmaster Bituminous Mixing Plant.

Another Larson Junior Tandem (new in 1947) is now operating at Plano, Illinois, to stockpile concrete aggregate which will be run to a Cedarapids Stationary Washing Plant. This unit is consistently producing 150 tons per hour of 1" minus material, with 25% crushing.

THE IOWA LINE *of Material Handling Equipment Includes:* ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PLANTS • FEEDERS • PORTABLE POWER CONVEYORS • PORTABLE AND STATIONARY STONE, GRAVEL AND SAND PLANTS • REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS • DRIERS • DUST COLLECTORS • HAMMERMILLS • WASHING PLANTS • VIBRATING SOIL COMPACTION UNITS • DOUBLE IMPELLER IMPACT BREAKERS

A heavily loaded Tournapull starts out on a 1½-mile run to dump.

And here a Euclid loader spills 15 yards of heaped load into a DW10 wagon.

Equipment for 25 Years!"

Says ELMER LARSON, Elmer Larson, Inc., DeKalb, Illinois

"We've been in the rock and gravel producing business 26 years, and for 25 of those years we've been using Cedarapids equipment for all our crushing, screening and washing operations. We bought our first Cedarapids Plant in 1927, and since then we've owned 22 Portable Crushing Plants, plus two Portable Washing Plants, and various Cedarapids Screens, Conveyors, Drag Scraper Tanks and Crushers. Our annual production with all the equipment we're operating now, averages around 250,000 yards. We're producing 13 different sizes for both wholesale and retail trade, ranging from pit run to washed sand, aggregate and crushed rock for concrete, State and County roads, driveways, etc. For big scale operations like ours, we say Cedarapids equipment can't be beat!"

"Here's why we're sold on Cedarapids Equipment"

- ✓ The good engineering and design of the plants.
- ✓ Consistently high production under all conditions.
- ✓ Stamina . . . We're still getting profitable output from some mighty old plants.
- ✓ Excellent portability.
- ✓ Minimum cost of upkeep.
- ✓ Excellent dealer service.
- ✓ Prompt, experienced help from the factory Engineering Department on our problems.

Like father—like son
THEY BOTH LIKE CEDARAPIDS

This is Elmer Larson's son, Leon, who is learning the business from the ground up and gradually assuming more and more of the responsibility. Leon Larson knows the business well enough to be choosy about equipment, and like his father, he selects Cedarapids.

It will pay you, too, to select your rock and gravel producing equipment with the utmost care. Ask your Cedarapids distributor to explain ALL the advantages of owning Cedarapids equipment.

Cedarapids
Built by IOWA

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

fied and consist of rich drift soil composed of finely ground limestone and shale with some schist. Residual deposits from ancient floods are quite easily recognized in the cuts.

But the bad boy of this formation can tie up a lot of equipment in a hurry. It is a particularly hard-to-handle recurring stratum of wet silt with much the structure of quicksand, which ranges from 8 to 15 feet thick and may appear high or low in a cut. In this silt machines lose their traction, foremen lose their religion, and the contractor will lose some equipment if left on its surface. The stuff won't load by scraper and bulldozers just mire down.

This is a spot where the contractor has to resort to trickery and slip up on the job from the rear. Fredrickson said everything in the book has been tried before by many contractors and that now he contrives to excavate this portion when it is discovered on a downhill angle.

For instance, if he was taking off the top of a hill at a fairly level rate when this silt started breaking through, he would immediately start excavating at a downhill angle. The idea of this downhill business is to preserve dry footing above and below the stratum of silt. The dry terrain above gives footing to scrapers for momentum enough to coast downhill through the silt and again touch dry land below before losing momentum. In this manner the scrapers pick up some silt as they fly through and the layer is gradually removed.

No doubt these layers represent some freak of geology and the very water that keeps the silt soft may well be the melted ice of the glaciers. Layers in the cuts show the area was often flooded in prehistoric times, evidently by the Missouri River. There are black rich layers of top soil sandwiched between layers of blue glacial clay. On the end near Hancock, the eastern end of the 13-mile section, Fredrickson was on the bank watching the scrapers load when he saw thousands of glittering particles in the yellowish clay. He went down to sample and found the clay was filled with strange tiny yellow particles which appeared to be a mineral. Several engineers present did not recognize the substance and it has been sent to a laboratory for analysis.

Many of the local residents are watching with interest for the day when the big earth-movers start to cut in a historical but supposedly unexplored Indian mound.

Slopes

Sideslope ratios are 1 to 1 and are trimmed by three heavy-duty graders —2 Adams and 1 Caterpillar No. 12 being used for this purpose.

The original plan was to finish the cut slopes in a series of benches, but this proved to be a deterrent to speedy excavation and the engineers changed the grade to a straight 1 to 1. Fill slope is 1½ to 1 and fills measure 144 feet wide at the base and 24 feet wide at the

(Concluded on next page)

Dirt-moving man—Harold Fredrickson, General Superintendent of Ace Construction Co., Omaha, Nebr.

Rubber-Tired Rigs Speed RR Grading

(Continued from preceding page)

top. Right-of-way runs from 150 to 275 feet wide.

Some idea of the grading on the 13-mile section as related to cuts and fills may be gained from the 12 sets of yardage figures computed by railroad engineers, which are as follows: 416,315; 983,504; 200,000; 553,000; 7,800; 160,000; 164,000, 102,000; 9,100; 83,000; 23,000; 282,000. These figures total up to 2,983,-719 cubic yards.

Excavation

No drilling or blasting was necessary to loosen the tightly packed material. Chief performer was a Euclid loader powered with a GM Series 71 diesel and pulled by an International TD-24. The "Euc" was set for maximum cut and loaded 15 to 20-yard wagons in 30 to 60 seconds in dry dirt. Even a little rain slicked everything up, including the crawlers, because of the preponderance of clay. In fact the chief delay was intermittent showers which blessed Iowa's farmers all spring. There was no drought in Iowa such as was experienced by her neighboring states on the south. Superintendent Fredrickson said it seemed like it would rain about every time they got dirt moving good.

The Euclid loader was keeping 7 Caterpillar DW10 wagons busy with heaped-up 15-yard loads and 3 Euclid 17-yard bottom dumps with all of them working on long hauls up to almost two miles and with an average run of about 4,000 feet.

Motor scrapers of several kinds were in use and busy on both ends of the job, which was separated by a 2-mile gap in which the Nishnabotna River was being bridged and an overhead crossing being made for U. S. 59 and the Carson Branch Line Railroad. These jobs were being handled under a separate contract by List & Weatherly Construction Co., of Kansas City, Mo.

Two International TD-24's — one hooked up to a Bucyrus-Erie Type B 22-yard scraper and the other to a 14-yard LaPlant-Choate scraper, both being used on short hauls—loaded in about 30 seconds. Three International TD-24's were used as push-loaders for pneumatic-tired motorized scrapers, while a TD-14 pulled a sheepsfoot roller for compacting the 8-inch lifts. The rubber-tired motor-scraper equipment consisted of one Heiliner, two Caterpillar DW20 tractors and DW20 scoops and 7 Model C Tournapulls of 22.7-cubic-yard struck capacity but heaped to overflowing. Two of the Tournapulls had "Jimmie" engines (GM Series 71 2-cycle diesels), while the other 5 machines were powered with 6-cylinder Buda diesels.

Fill was spread in 8-inch average lifts. A Caterpillar D6 dozer and a D5 dozer and a Model C Tournadozer with 186-hp GM engine, spread the loads, which were then compacted by the TD-14 International with the sheepsfoot. Heavily loaded pneumatic-tired hauling equipment also assisted materially in compaction as they made their runs over the fills.

Routes of the loaded wagons and motorized scrapers were kept graded as smooth as possible to facilitate running them at top speeds. Runs were made at top speeds of 20 to 50 miles per hour depending on the equipment. A Lima 1-yard crane hooked up as a dragline was used for rough-grading slopes, drainage ditches, and other utility jobs. Precise and finish grading was handled by a No. 12 Caterpillar with a 12-foot blade and 2 Adams motor graders.

An 8-inch zinc-refuse top is being spread on completed sections of the grade under a separate contract. Refuse from a zinc smelter at Depue, Ill., is shipped to the site in railroad gondolas. These are unloaded by crane and clamshell into trucks which haul the refuse to the top over an access road that has been established to connect with U. S. 59 and is adjacent to the branch-line railroad where the cars are spotted. Eight inches of gravel ballast and 6 inches of slag ballast will be spread on top of the zinc refuse after the steel is laid.

The Rock Island is anxious to complete the job by late spring of 1953, according to company officials, and this means that 6,000,000 cubic yards must be moved in the 11 months between July, when the job was visited, and next May—with a winter in between.

The new track location will cut 10 miles off the existing route, reduce the grades, and eliminate most of the curves. It is part of a big expansion plan to increase the speed of westbound freight through the Denver gateway.

Railroad-company civil engineers in direct charge of the job are: W. B. Throckmorton, Chief Engineer; W. E. Simpson, Construction Engineer with headquarters in Atlantic, Iowa; L. Q. Hill, K. E. Gregory and H. E. Strate, Resident Engineers.

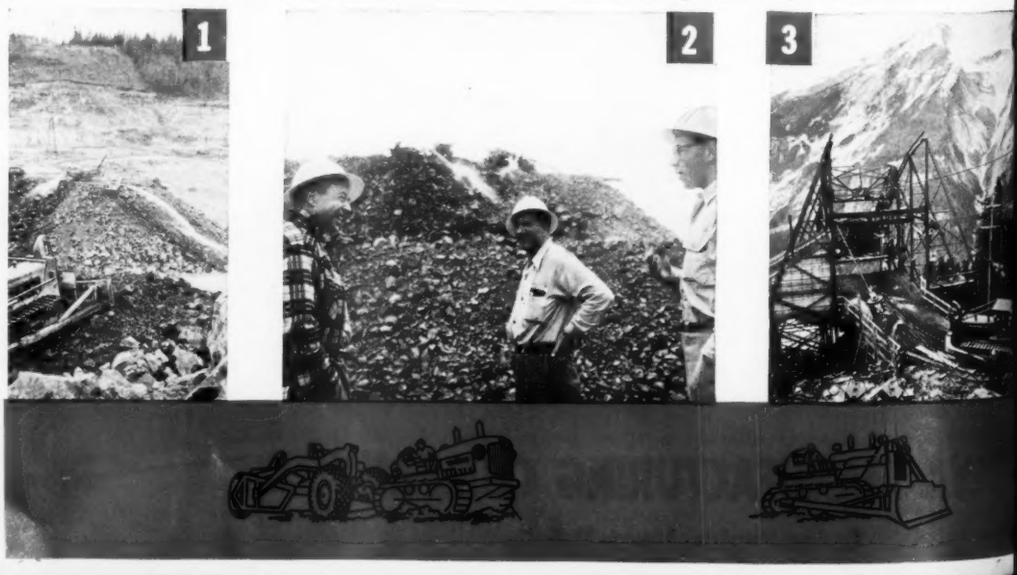
Big

ESTABLISHING MOUNTAIN-TOP BASE, a helicopter and a TD-24 put men, machinery and supplies on mile-high pass as first step in efforts to build road down to meet section coming up from each side. TD-24 pulled yarder, winch, and compressor into pass after bitter 7-day fight.

1 RAISING KENNEY DAM to fill the Grand Canyon of the Nechako River, workers sluice down some of the 3.8 million cubic yards of earth and rock it will eventually contain. Dam will form a reservoir with twice the capacity of Grand Coulee. TD-24 in foreground strips blasted rock from canyon wall abutment.

2 HEADING OPERATIONS at Kenney Dam are (left to right) Alcan Resident Engineer Harry Jomini; General Superintendent "Hak" Nielsen and Project Manager Jack Bremner, both of Mannix, Ltd., sub-contractor for Morrison-Knudsen Company of Canada, Ltd. 110 miles west, dammed-up waters will be diverted through mountain and dropped a half mile to run turbines in sea-level powerhouse.

3 DRIVING TEN-MILE TUNNEL through mountain is done from four headings. Here, half a mile above ocean-level valley, aerial tramway has delivered TD-24 to tunnel portal for working debris down mountain. 2,600 feet below, eight-story powerhouse inside mountain is being mucked out by a TD-24 and a TD-9.



Wire Clip Splicing

A new method for splicing wire that is drawn through patenting furnaces is announced by the Manco Mfg. Co., Bradley, Ill. The operating cycle of the Model R-210-187E Guillotine splicer unit used with Manco clips is one second. A thumb button actuates hydraulic pressure of 10 tons from a hydraulic pump driven by a 2-hp motor.

In connecting wire coils, the operator slips the wire ends into the clip, loads the clip into the splicer, and presses the button. After the patenting operation the clips are cut off the wire. Clips are available in 7/32-inch and ½-inch sizes.

According to the manufacturer, this new development eliminates heating and bending, tied ends, and welding, besides being speedy and easy to use.

Here is the Manco Model R-210-187E in action. It splices wire at the press of a thumb button.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 897.

Engine-Generator Set

A new 115-volt 60-cycle ac engine-generator set has been developed by Wincharger Corp., E. 7th and Division Sts., Sioux City 2, Iowa. It has a starting capacity of 4,500 watts, which enables it to start and run motors up to 1½ hp.

The Model 4500 has a 3,000-watt intermittant rating and a 2,500-watt continuous rating. It easily operates many portable tools including cutoff saws, electric chain saws, masonry saws, and concrete vibrators, the company says. Klixon thermostatic cut-out switches with manual reset protect the generator from overload and overheating. A cast-iron outlet box on the top of the generator provides a voltmeter and one 20-amp and two 15-amp twist-lock-type outlets wired in parallel.

The Model 4500 is available with either the standard tubular cradle base or Speedy-Shift portable base attachment. The latter has a single handle and semipneumatic rubber-tired wheels for tip-proof mounting and easy handling. The unit is designed for maximum portability with either a Briggs & Stratton No. 23 or Wisconsin No. AEN 4-cycle engine. The Universal mounting base permits sale of the unit with or without engine.

Further information may be secured from the company. Or use the Request Card bound in at page 18. Circle No. 888.

Red TD 24 Pioneers New Frontier

9 International TD-24s spearhead largest integrated engineering program in istory for Alcan (Aluminum Company of Canada, Ltd.) on Project British Columbia

leet of 59 hard-hitting International TD-24s is ring a new frontier across 5,000 square miles of derness in British Columbia.

Twenty-four hours a day, they're on the go for rrison-Knudsen Company of Canada, Ltd., prime ntractor for most of the giant development that cludes:

lding the largest sloping clay core dam in the world
ving a subway-size tunnel ten miles through a mountain
cting out an eight-story powerhouse two blocks long side solid rock
cing a transmission line fifty miles long over a jagged ountain range
ing the world's largest aluminum smelter and a new t city at Kitimat where 50,000 people may eventually e and work.

O. Strandberg, project manager for Morrison-nudsen, says:

"These TD-24s are doing the impossible. We never thought any tractor could go where these tractors are working now. They have the weight, they have the balance, and they have the power to get the job done."

And here's what superintendents on the firing line say:

Bill Richards: *"They're pushing boulders uphill we had to dynamite in the old days."*

Herb Wilkinson: *"I wouldn't believe where they'd go until I got them on my crew."*

John Hutton: *"They're doin' work up here they were never built for but they're doin' it just the same."*

Your International Industrial Distributor can give you the facts and figures on the TD-24. See him: You'll be a TD-24 man from then on in!

INTERNATIONAL HARVESTER COMPANY • CHICAGO 1, ILL.

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POWER THAT PAYS

SPECTING MOUNTAIN TOP OPERATIONS at Kemano, head-quarters for construction of powerhouse, tunnels and trans-ion line are (left to right) A. O. Strandberg, Project Manager for rrison-Knudsen; F. T. Matthias, Alcan Assistant Project Manager, Walter Abrahamson, Alcan Assistant Resident Engineer at Kemano.

UNKING UP POWER TRANSMISSION LINE ROAD, a pair of TD-24s doze toward each other through blasted rock. Across miles of rugged terrain like this, a mountain-anchored powerline will be built to flash abundant electricity from mountain powerhouse to smelter at tidewater.

6 **NEW LAND IS MADE IN OCEAN INLET** by dredge which deepens anchorage for ocean shipping at the same time. H. M. Whiting (right), Project Manager for Kitimat Constructors, Ltd., and a superintendent study progress. Part of this 70 acres of new land will become site of new aluminum smelter. Town which may eventually become city of 50,000 will be built across the bay.

Producers' Council Plans A New Information Service

The Producers' Council, a national organization of building-products manufacturers with headquarters in Washington, D. C., has planned to direct its major attention next year to giving factual information about the proper uses of new and improved building materials to other branches of the construction industry.

According to Elliott C. Spratt, Secretary of the Hillyard Chemical Co., St. Joseph, Mo., and newly elected President of the Council, the aim of the program is to help reduce the cost and improve the quality of construction by showing architects, builders, contractors, and distributors how to utilize most efficiently the many products now on the market. Data will be disseminated through informational meetings, product displays, films, and technical literature.

The organization feels this informational service is timely because, as soon as the steel shortage has eased, the building industry will again face a completely free and unrestricted market, which may mean that the production of building products will reach a new all-time high. Also, the demand for building products during the next year should reach a high level, since there will unquestionably be a large volume of private building while a good deal of military and defense construction will still be under way.

Heil Expands District Sales

A revision has been made in the district sales territories of the Heil Co., Milwaukee, Wis. Two new district offices will be opened in Cleveland, Ohio, and Denver, Colo., in addition to the present offices at Hillside, N. J.; Washington, D. C.; Atlanta, Ga.; Chicago, Ill.; Milwaukee, Wis.; Kansas City, Mo.; Dallas, Texas; Los Angeles, Calif.; and Seattle, Wash. Canada, Alaska, and Hawaii will be handled as domestic territory and will be serviced through the district offices.

The following District Managers have been appointed: Robert Rose, Hillside office; Fred Wrede, Washington, D. C., office; William Schumacher, Cleveland office; Herbert Erdman, Milwaukee office; John Zimmerman, Denver office; and D. J. Kuhlman, Chicago office.

Moles Name 1953 Winners

Peter Kiewit of Omaha, Nebr., and Edward P. Palmer of New York City are the 1953 winners of the Moles Awards for outstanding construction achievement. The presentations will be made on February 4, 1953, at the annual Moles Award Dinner in New York City.

The Moles, New York association of men engaged in tunneling and heavy construction, present awards each year to one member and one nonmember in recognition of outstanding service to the American construction industry.

Mr. Kiewit, the nonmember, heads the firm of Peter Kiewit Sons' Co., which holds the general contract for the new Atomic Energy Commission plant to be built in Ohio. The company also played a major role in the construction of the new U. S. air base at Thule, Greenland. Mr. Palmer, a member of Senior & Palmer, Inc., a firm specializing in heavy and railroad construction, is a past president of the Associated General Contractors of America, Inc.

This Model TS-300 motor scraper was the first shipment from the Cedar Rapids, Iowa, works of Allis-Chalmers Mfg. Co. It followed shortly after A-C's acquisition of LaPlant-Choate Mfg. Co., Cedar Rapids.

LaPlant-Choate Now Cedar Rapids Works

All property of the LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa, which was officially acquired by Allis-Chalmers Mfg. Co., Milwaukee, Wis., began operations on September 15 at the Cedar Rapids Works of the Tractor Division. A. D. Dennis, President of LaPlant-Choate, is General Manager of the Works, Wallace Gates is Works Manager, and H. W. Rockwell is Chief Engineer.

The rubber-tired motor-scraper equipment rounds out A-C's industrial line, which includes crawler tractors and motor graders built at the Springfield, Ill., Works and industrial wheel tractors and power units made at the West Allis, Wis., Works. The LaPlant-Choate line includes the TS-200 motor scraper with a capacity of 10 cubic yards struck and 13 heaped; the TR-200 rear-dump motor wagon with capacities of 18 tons or 11 and 15 cubic yards struck and heaped; the TS-300 motor scraper of 14 and 18 cubic yards struck and heaped; and the TW-300 bottom-dump motor wagon of 22-ton capacity or 14 and 19 cubic yards struck and heaped.

Cedar Rapids Works products will be sold and serviced through Allis-Chalmers dealers.

Catalog on Auger Drills

A 4-page bulletin describing the McCarthy vertical and horizontal auger drills in operation is offered by Salem Tool Co., S. Ellsworth Ave., Salem, Ohio. It illustrates various types of augers and drill heads, giving sizes and description for blast hole drilling and subsoil testing.

This literature may be obtained from the company, or by using the Request Card that is bound in at page 18. Circle No. 880.

Sonoco Acquires Gates Paper

Sonoco Products Co., Hartsville, S. C., manufacturer of paper specialties, has acquired Gates Paper Co., Los Angeles, Calif. In the future the plant will manufacture Sonotube, the fiber forms for concrete piers and columns, and Sonair-duct, fiber duct used in warm-air heating installations. E. H. Southwell, former President of Gates, will remain as Sonoco's Manager for the plant and will also have charge of sales for the Western Division.

This is Sonoco's sixth plant in the United States. The others are located in Mystic, Conn.; Philadelphia, Pa.; Garwood, N. J.; Lowell, Mass.; and Hartsville, S. C. (home office and main plant).

DOES A LOT OF JOBS for a Lower Investment

ROSCO Model RHU MAINTENANCE DISTRIBUTOR

General Purpose Unit for Handling All Types of Bituminous Materials

This efficient machine is designed for contractors, including those who want to get started in road work. Rosco Model RHU is also in demand by cities, towns, counties, state and federal authorities because it can maintain streets and make road repairs at low cost. This machine will do a variety of jobs with such features as loading . . . transferring . . . spraying . . . handspraying . . . circulating . . . reverse suction . . . clean-out . . . gravity draw-off. For mounting on trucks of 60" to 72" from back of cab to center rear axle. Built in 800 and 1000 U. S. gallon capacities.

Ask your Rosco dealer for complete specifications, or write the factory.

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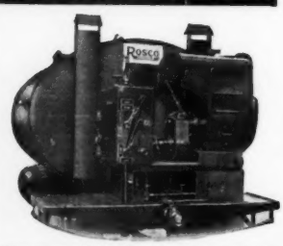
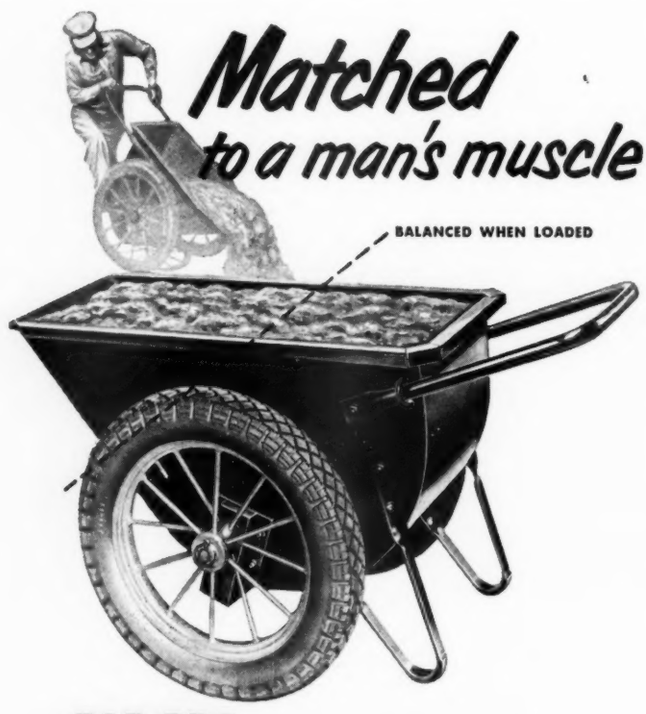
3118 Snelling Ave. • Minneapolis 6, Minn.



Burners and all operating equipment mounted at rear. Stationary or shifting type spraybars available in three styles.



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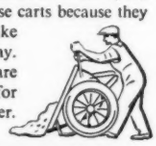
LET A MAN HANDLE ALL HE IS ABLE . . . and he can handle up to 8 cu. ft. when the load is perfectly balanced. A Gar-Bro cart balances a full load; lets a man devote his entire energy to pushing. Men like these carts because they are lighter and easier to handle; are less tiring. You'll like them too, because your men move more concrete per day. There are two sizes, 6 and 8 cu. ft. capacity. Tires are heavy duty pneumatic, or steel. A rocker attachment for easy dumping is available. Write for name of local dealer.



EQUIPMENT GAR-BRO ENGINEERING SERVICE

GAR-BRO MANUFACTURING COMPANY
2415 EAST WASHINGTON BLVD., LOS ANGELES 21, CALIFORNIA

for faster concrete handling

BRADFORD ELECTRIC SAWS

Model 160 — 6" Saw
(Can be furnished with blade on right or left side)
Vertical depth of cut 2"
Bevel cut at 45°: 1¼"
Net weight 10 lbs. 8 oz.

Model 180 — 8" Saw
Vertical depth of cut 2 29/32"
Bevel cut at 45°: 2 1/16"
Net weight 17 lbs. 8 oz.

These new 6" and 8" Bradford Portable Electric Saws are ruggedly constructed and fully powered to take on the *toughest* sawing jobs! They're better designed—inside and out—for easier handling, smoother sawing, more accurate work. You can *feel* the difference in the Bradford design!

And Bradford Saws are built to last. Ball bearings with permanent lubrication are used throughout. Gears are helical cut to give maximum driving power. A powerful 110-volt AC/DC motor drives the blade with quiet, cool-running efficiency.

Own a new Bradford Portable Electric Saw — they're the choice of craftsmen everywhere. See your Bradford dealer for a demonstration. Write for bulletins giving specifications and prices.

THE BRADFORD MACHINE TOOL CO.

653 Evans Street Cincinnati, Ohio

Precision since 1840

Tunnel Crews Drill Under City's Center

Sewage Tunnel for Spokane Penetrates Basalt Under City Street as Contractor Drives From Two Headings

• FIFTY feet under one of the main streets of Spokane, Wash., deeper than men have ever gone down through the basalt and glacial till underneath the city, two fast-moving underground crews are pushing a tunnel from two headings. The crews are those of C. A. Power and the Cheff Construction Co., of Spokane and Seattle respectively, whose joint-venture $750,000 contract with the City of Spokane is delivering the last important segment of tunnel in a 10-mile sewage-intercepting system. When it is finished in 1953, the tunnel will carry sewage under Trent Avenue from Scott to Post Street.

With a present population of 161,000 people, Spokane is well along on its program to stop dumping raw sewage into the Spokane River, a clear fast-flowing mountain stream which roars through the city. The work is in line with a general pollution-abatement program throughout the Pacific Northwest.

Old System Simple

Spokane's original sewage-disposal system was ridiculously simple. The city is situated along both sides of the river, and the terrain slopes down sharply to its banks. It also pitches toward the west, falling as the river drops. As the city grew, sewage-disposal lines were simply laid so they ran to the river. From the point at which these many lines dumped waste material, the river carried it away. In time, it got to be a bad pollution hazard.

Today's program is also a natural outgrowth of that early system. A main interceptor, consisting of 72-inch reinforced-concrete pipe and some tunnel sections through rock, is being laid along the river bank to intercept the disposal ends of all the feeder sewers. One high-pressure steel line has been laid across the river, and a concrete line will also pass across the stream on one of the bridges at Spokane. This interceptor will collect all the sewage and carry it to the northwest edge of town, where a 133-mgd sewage-treatment plant will be built sometime in the not too distant future.

The intercepting system is now about 60 per cent complete. It was started from the treatment-plant end, so ties with sewer outlets could be made as necessary. The ties are being made with valves, so the sewage can be shut off in an emergency. Power and Cheff's tunnel job will take care of about 6,250

(Continued on next page)

Ray Day Photo

At the levers of a Jaeger hoist, Hoisting Engineer Irwin Burr brings a load of broken rock to the surface. His oiler and helper, Ray McCann, watches.

Komac* Premix

applied quickly . . . easily in any kind of weather

THE PATCH under the moving truck was opened to traffic immediately. Notice, too, that Komac Premix does not stick to tools.

THIS new, easy-to-apply road patching premix can be used all year round . . . rain or shine, hot or cold. Just sweep out the hole and patch with KOMAC Premix . . . compact thoroughly, then open to traffic.

KOMAC Binders, offered exclusively by Koppers, mix easily and quickly with local aggregate. Since KOMAC Premix stays workable in the stockpile for a year or more, it is immediately available for use when you need it most.

*Koppers trademark

KOPPERS Komac PREMIX

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For road building or resurfacing

TARMAC resists the stripping action of water . . . even withstands the softening effect of gasoline and oil drippings.

You can speed up construction work with TARMAC, because it penetrates quickly into roadbeds, mixes easily with local aggregate, adheres quickly and cuts through dust and moisture films to coat the aggregate.

KOPPERS COMPANY, INC., Tar Products Division, Dept. 1156-T, Pittsburgh 19, Pa.

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Tunnel Crews Drill Under City's Center

(Continued from preceding page)

linear feet of the 10-mile system.

Bidding schedules gave contractors the choice of a round and an elliptical tunnel section. Power and Cheff chose the elliptical section, which is a modified form of a horseshoe type. The rough excavation is 7 feet 10 inches high x 6½ feet wide. Concrete wall lining 12 inches thick all around will reduce this section by approximately 2 feet each way.

Small Tunnel: Tough

Small tunnels can be as diffcult as big ones, if not more so. This is no exception. Tunnel grade is about 20 feet below the prevailing water table. The excavated muck has to be brought up to the surface of one of Spokane's principal streets, and hauled away. At the west end of the project the basalt rock dips sharply, and part of the tunnel bore is expected to pass through gravelly glacial till. The sides and top will have to be protected against shoving ground and infiltrating water.

The contractors studied the situation and decided to sink a 50-foot shaft, approximately in the center of the job, and work two headings simultaneously from that point. A yard and headquarters were fenced off at that point. Hoisting equipment, air compressors, and a project maintenance shop were set up.

The tunnel excavation in basalt does not need inside support, and the rock stands up well without sloughing in. Tunnel excavation is going forward on a double-shift 5-day-a-week basis, and the two headings are producing an average of 3 rounds, each 6½ feet long, per day.

Drilling at each heading is being done by two Gardner-Denver 73 machines, using Timken steel and Timken tungsten-carbide bits. Tungsten-carbide drill bits were selected because the rock was extremely hard on bits, and this type could be expected to give between 100 and 200 feet of hole per sharpening.

A 25-hole pattern is being used, pulling the rock from a center 3-hole burn. Relievers, arch holes, and lifters all fire into the center burn with the help of millisecond delays up to No. 7. The drill holes are being held to 1-inch diameter at the bottom, and 1-inch cartridges of Du Pont gelatin powder are loaded into each hole. It requires about 1.8 pounds of powder per cubic yard to bring the basalt out. The shots are fired electrically from the power line.

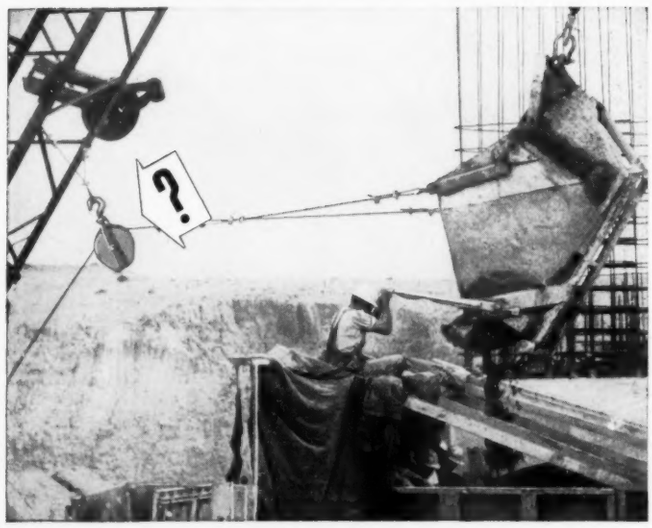
Leading into the tunnel are 16-inch lines from two G-E-powered Ventair blowers, which keep the air inside the tunnel fit to breathe. Other lines leading into the tunnel include a 4-inch air header from two 350 cfm Gardner-Denver and Ingersoll-Rand compressors, a water line, and power lines.

Mucked material is being loaded from the heading by an Eimco 12-B Rocker-Shovel, loading into ¾-yard narrow-gage railroad cars. Small car movers are being used to make up the trains, which will be approximately 8 cars long when the tunnel portals are holed through.

The broken rock is hoisted to the top of a heavy timber framework at the head of the middle shaft, where it is dumped to waiting 7-yard trucks, which haul it about ¾-mile to a designated disposal area. The shaft hoist is a Jaeger 2-drum gasoline-driven rig, with cables leading to the top of a heavy 8 x 8 fir-timber framework.

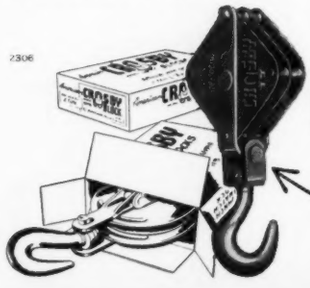
Excavation of the tunnel is moving along satisfactorily, and the contractor's men are beginning to think about lining the hole. Plans are under way to place the invert lining first, following this up with arch concrete. The latter material will be placed behind steel liner forms, which will roll along on the invert concrete. The concrete lining will be placed by a Rex Pumpcrete machine or machines, so the two portals

What's the capacity of this block?



If you don't know.. **don't use it!**

Put yourself in the place of the man at the concrete bucket. If that block behind him should fail . . . what chance would he have? Somewhere, today, a man who works for you may entrust life and limb to a wire rope block in the same way. If it's an American CROSBY block, you can breathe easy . . . because it's LOAD-RATED. *Safe working capacity is clearly embossed on the side plate;* and every man using it can know when he's working safely. In addition, American CROSBY wire rope blocks have extra reserves of strength and toughness in every part. And they're individually packaged, for easy stocking, handling and identification. Sold by distributors and mill supply houses everywhere. Made by AMERICAN HOIST & DERRICK CO., ST. PAUL 1, MINN.



2306

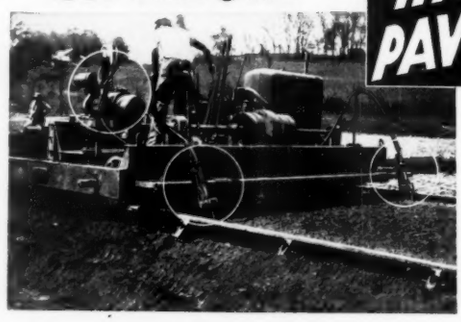
American CROSBY

Load-Rated!

WIRE ROPE BLOCKS

Maginniss HI-LECTRIC **CONCRETE VIBRATORS ON THE JOB–**

VIBRATING HIGHWAY PAVEMENTS



NO FLEXIBLE SHAFTS

ELECTRIC MOTOR IN HEAD

REMOTELY CONTROLLED BY OPERATOR

With a Maginniss HI-LECTRIC Vibrator, concrete placing in any type of form is faster, cheaper, effortless, with a better looking job when the forms are removed.

The HI-LECTRIC Vibrator is strictly one-man operated. The on-off switch is at his hand, while the power unit operates unattended up to 200 feet away.

Maginniss POWER TOOL CO.
MANSFIELD, OHIO

MORE WATER with an Essick AUTO-PRIME!

There's no need to accept conventional, low rated pumps when you can get an Essick A.G.C. rated, heavy duty Auto-Prime centrifugal! These ruggedly constructed self primers are perfect for all dewatering applications —and are especially profitable to contractors in the building trades. They prime quickly—*reprime automatically*—force a tremendous volume of water through the line.

Essick Auto-Prime Pumps are GUARANTEED to pump more water against a higher head in less time—*yet they cost no more than ordinary units—often less!*

Sales and Service Coast to Coast and in Foreign Countries

See your Essick Dealer or write for money-saving facts today.

ESSICK

Essick Manufacturing Company

1950 Santa Fe Avenue, Los Angeles 21, California

and the center shaft will give four points of entrance for this material.

If severe ground-water conditions are met when the glacial till is met, the tunnel will have to be supported with timber or steel, and possibly some air driving will have to be done. In any case, the water-pumping job will be sizable.

Elmer Cheff, General Superintendent, is handling the field work for the contractor. He is assisted by William Allen, Night Superintendent, and Nick Flynn, Assistant Day Superintendent. John Bonderenko is Master Mechanic.

For the City of Spokane, City Engineer Charles E. Davis is in general charge of the work, with Dwight L. Myers acting as Project Engineer.

Tunnel driving should be completed by July, 1953, and the concrete lining should move along rapidly, so that the tunnel will be finished by the end of next year. At that time another important milestone will have been reached in the construction of the interceptor system, and Spokane will have advanced to the day when it no longer will pollute a beautiful river facing its door.

Three Small Engines With Increased Rpm

Increased rpm in smaller engines is announced by Caterpillar Tractor Co., Peoria 8, Ill. The D318, D315, and D311 60-cycle self-regulating electric sets now operate at 1,800 rpm. However, the 1,200-rpm electric set will continue to be the standard model.

The D318 standard-model electric set has a 12-hour rated output of 45 kw. The modified D318 operating at 1,800 rpm is rated at 60 kw. Radiator and fan will limit the modified set to a rating of 59 kw. (Kilowatt-output ratings for standard models are based on operation of the complete electric set equipped with radiator and fan.)

The output of the D315 electric set is rated at 30 kw. At 1,800 rpm the rating is set at 40 kw. In this model, addition of radiator and fan does not reduce the rated output.

The smallest of these three electric sets, the D311, is rated at 21 kw at 1,200 rpm. At 1,800 rpm it is rated at 30 kw with radiator and fan limiting output to 28 kw. The D311 electric sets will also be available to deliver current in single-phase voltages at 1,800 rpm at 25-kw rated.

Generators are self-regulated and are mounted with belt-driven exciter. Flexible coupling drives the rotor, which is carried by two ball bearings. Generators for 50-cycle operation and for a variety of voltages are available with the sets.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 945

Heads Dayton CE Department

Edward J. Baldinger, Assistant Professor of Civil Engineering at the University of Dayton, Dayton, Ohio, has been appointed Acting Head of the Department of Civil Engineering. A former Army man with the Corps of Engineers, he has been a member of the Dayton faculty since 1947.

For the Finest in Chain Saw Performance — Lombard Model 7 Two Man Saws with new Warren High Speed Chain

Dept. 7 12% more power 10 lbs. lighter weight

LOMBARD GOVERNOR CORP.
ASHLAND, MASSACHUSETTS

C. P. Street

A. G. C. Nominees

C. P. Street, Secretary and Manager of McDevitt & Street Co., Charlotte, N. C., has been nominated for 1953 President of The Associated General Contractors of America. Currently Vice President, he has served as Chairman of the Building Contractors' Division and Public Relations Committee, and as Vice President and President of the Carolinas Branch. He is a member of several of the Association's committees.

The Vice Presidential nominee is John MacLeod, President of Macco Corp., Paramount, Calif., and currently Chairman of the A.G.C. Public Relations Committee and a member of various other A.G.C. committees.

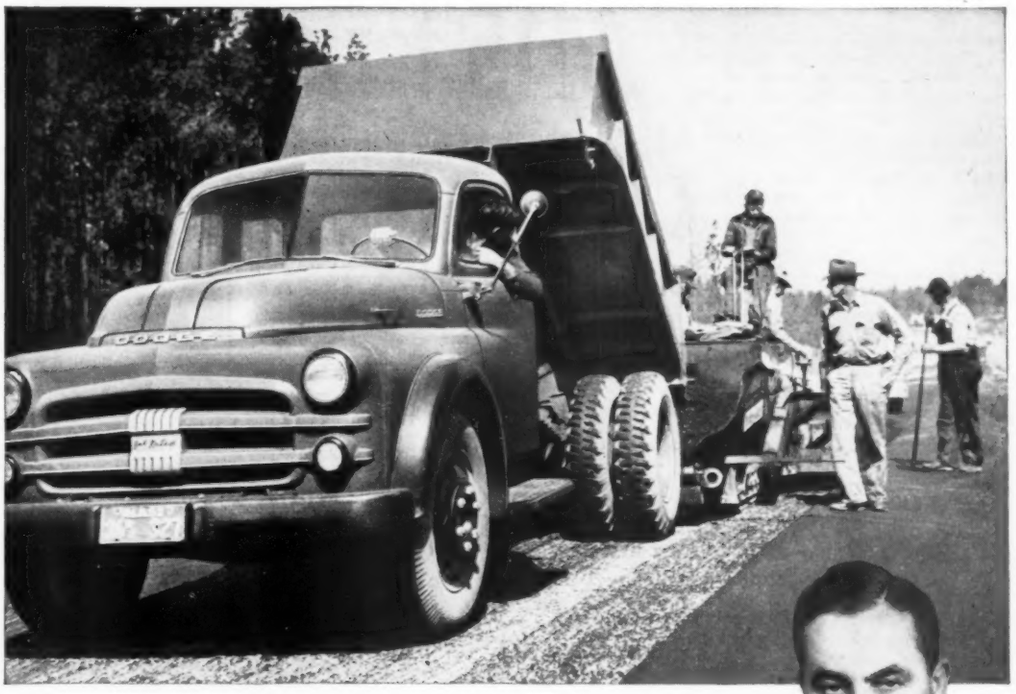
Voting is to take place at the A.G.C. convention in Miami, Fla., next March.

An Improved Mixer

An improved tilting concrete mixer, the Model 3½-S, is made by the Kwik-Mix Co., Port Washington, Wis. Powered by a standard-make gasoline engine of 3.4 hp with smooth V-belt power transmission, the half-bag end discharge Dandie mixer has improved mixing blades for faster mixing cycles. The company points out that operators can tilt the loaded drum easily for discharging because the tilting device works through a gear-reduction arrangement for minimum effort. A friction brake will stop and hold the drum in any position. The Kwik-Mix push-down tow pole makes it safe for one man to move the mixer anywhere on the job or hitch it to a truck for trailing.

The 3½-S Dandie has a 43-inch charging height and 18-inch drum opening for easy loading. The all-welded steel drum has a reinforced lip, a separate ring gear, and a box-section yoke for long life, Kwik-Mix reports. A steel axle provides a sturdy undercarriage; spring mounting and standard-size pneumatic tires absorb shocks and vibrations. Convenient storage hangers are provided on the mixer to prevent loss or damage to the removable engine house cover and the 64-inch tow pole.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 896.



"Dodge beats any other trucks we ever owned!"

says J. R. BRYANT, J. R. Bryant Construction Co., Montgomery, Alabama.

"Last summer we put in a 13-mile stretch of mountain road where the trucks had to grind up steep grades in low gear. It was hot—and many of the trucks couldn't take it. But our Dodges never overheated and came through better than any of them.

"This job showed us that Dodge beats any other trucks we ever owned. Take the Dodge KA-140 with dump body, for example. It'll haul all the law allows and you can't hurt it. You can run it day-in and day-out with less overhead than any of them, and you can't find a cheaper truck to operate.

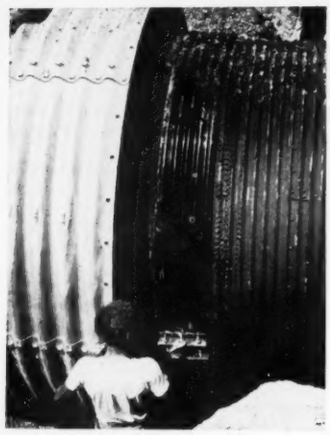
"Our drivers like Dodges better, too, because they handle like a car. They turn on a dime and this saves a lot of time on the job."

Mr. Bryant has proved by experience that Dodge "*Job-Rated*" trucks serve him better and save him more. *They'll do the same for* YOU!

For *your* job, there's a Dodge truck "*Job-Rated*" at the factory for top performance and lowest costs. You'll get big power with real economy. And you'll get famous Dodge dependability that means low upkeep and long life.

Ask your Dodge dealer about the rugged 2½-ton model with 114-h.p. engine. Or the powerful 2¾-ton model with optional twin carburetion and exhaust system. Your friendly Dodge dealer will welcome an opportunity to co-operate with you on any hauling problem.

DODGE "Job-Rated" TRUCKS



In this sewer-outfall design, the end of the 102-inch sewer was placed in 120-inch Multi-Plate pipe and the space between the two pipes filled with concrete. It was planned by Armco Drainage & Metal Products Inc.

Floodproof Outfall

An ever-present design problem in sewer outfalls—determining the type of end treatment for the sewer where it is exposed to flooding and high-velocity cross currents—was recently solved in a new way by engineers of Armco Drainage & Metal Products, Inc., Middletown, Ohio. The usual method has been to build a massive headwall with wingwalls and current deflectors set on piling, and this was at first proposed for a sewer job at Middletown. The plan, however, is expensive, due to the intricate formwork and reinforcing, and the amount of concrete and piles required. It is hazardous, too, because flood waters often cut under and behind the structures, causing the sewer proper to become detached from the headwall.

In the Armco design, the last 32 feet of 102-inch asbestos-bonded sewer was placed in 120-inch Multi-Plate pipe and the annular space between the two pipes filled with concrete. The double-pipe section was attached to two concrete saddles shaped to fit the bottom third of the outer pipe and located at about 8 feet from each end of the 32-foot length. The design not only saved several thousand dollars, as opposed to the usual headwall plan, but also is expected to be a more permanent structure for conditions usually encountered at sewer outfalls.

Steam-Jet Cleaner

Design changes and improvements in the steam-jet cleaner JC-10 are announced by Livingstone Engineering Co., 100 Grove St., Worcester 5, Mass. Higher operating pressures (to 150 psi) and closer fingertip control of steam-detergent mixtures make the JC-10 an effective tool for light-duty cleaning of machinery and motors, the company claims.

The Speedylectric JC-10 may be used for cleaning engine blocks, flushing cooling systems thawing out frozen radiators, brakes, and gas lines, and for cleaning parts and assemblies before repair. It requires 26 x 17 inches of floor space; weighs less than 200 pounds; and has 10-inch rubber-tired wheels for maximum portability.

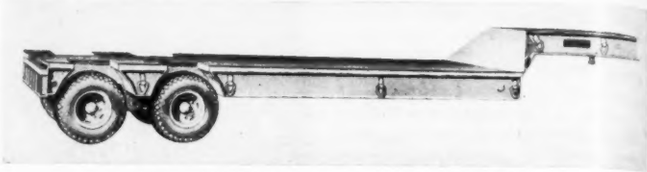
The JC-10 uses steam from the built-in high-pressure Speedylectric boiler Model 500-S3. The company points out that small quantities of solvents are used effectively and economically for they are not diluted by mixing with gallons of water at the jet. Dirt, grease, oil, and caked-on accumulations melt away before the high-velocity jet of hot dry steam and solvents, which can be applied instantly as needed under push-button control of the operator. There is no flooding of the working area, no smoke, flames, or fire hazard, the company claims. The Speedylectric unit is free of low-water danger. The boiler water itself is the electric-resistance heating element, and if there is no water no current passes and no steam is generated. The JC-10 is available for single or polyphase power supply of 220, 440, or 550 volts, ac current.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 885.

Acrow's New Vice Presidents

Acrow, Inc., Chicago, Ill., manufacturer of shores, has appointed two new vice presidents. John J. Edmunds, Vice President of Acrow, New Jersey, Inc., and Edgar F. Copenhafer, Vice President of Acrow, California, Inc., have both been with the company for two years. Mr. Edmunds will assume his new duties following a two-month tour of Europe; Mr. Copenhafer, after a six-week trip to Mexico. Both vacations were gifts of the company.

SOLVE YOUR HAULING PROBLEMS WITH
A "TRANSPORT TRAILER"
Capacities through 75 Ton—Semi and Full Trailers



CARGO CARRIER MODEL GPX (Semi) with Tandem Axles

PATENTED TANDEM AXLE ASSEMBLY—Featuring unusual lengthwise and sidewise wheel accommodation to irregularities in the road. Use of full width tubular forged, heat treated axles with CAMBER.

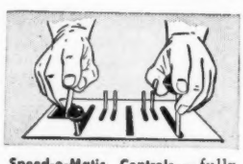
FRAME—Constructed of beam sections throughout, electric welded. A ruggedly strong and efficient unit with minimum weight.

TRANSPORT TRAILERS, INC.
TRANSPORTATION ENGINEERING A SPECIALTY
CEDAR RAPIDS, IOWA, U.S.A.

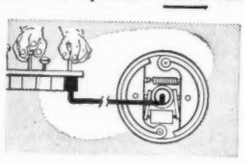
$115 for service in 5 seasons
--record of rugged K-370 with power hydraulic controls

LOUIS MARSACK & SONS, St. Clair Shores, Mich., load out 2500 yds. of sand and gravel every 8 hours with this 1½-yd. Link-Belt Speeder. In addition to the low service cost above, which excludes engine service—the K-370 provided further savings by replacing two smaller competitive rigs formerly necessary to handle this work. Operator Grant Marsack says, "It's easy to operate, has plenty of power, and needs no adjustments to speak of."

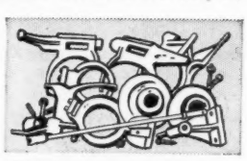
These Link-Belt Speeder PLUS FEATURES mean more output, less cost



Speed-o-Matic Controls — fully hydraulic! You "feel" the load all the way. Simple, easy—fingers instead of muscles do work.



Speed-o-Matic Clutch—hydraulically actuated, simple, smoothly responsive. Runs cool. Eliminates need for frequent adjustments.



Eliminates up to 150 parts — cuts friction, no worn bushings, pins, links or clutch toggles to put you "down."

Service — fast, efficient. Link-Belt Speeder Service is nationwide—near you with replacement parts, factory-trained mechanics.

LINK-BELT SPEEDER
CORPORATION
Builders of the most complete line of shovels, cranes and draglines
CEDAR RAPIDS, IOWA

Mud Is Squeezed Up By Fill, Not Dredged

Congestion is increasing in the booming San Francisco Bay cities, and fill is needed for new highways. But it is slow and expensive to follow the usual process of dredging the soft mud underlying the water of the bay before solid fills are placed. So the California Division of Highways, with H. L. Moses as Resident Engineer, is experimenting with a unique type of fill—shale and clay placed without first dredging the mud away.

The plan is to dump the material right over the mud and allow it to settle. The fill pushes the soft mud out from under it, and the mud, in turn, rises alongside the fill and allows the latter to settle on the firm base provided by the hard mud underneath.

The fill is being placed south of Visitation Point, near Bayshore, San Mateo County, about two miles from Sierra Point. The soft-mud bottom here is approximately 50 feet deep and overlies hard compressed mud which will support ten tons per square foot. At present, the fill is being extended some 2,000 feet into the bay in water averaging 10 feet in depth at mean tide. Working under the supervision of the California Division of Highways, District No. 4, Keeble Construction Co., San Jose, Calif., contractor for the $175,000 contract, is using ordinary earth-moving equipment. Two-thirds of the material is being moved by self-propelled scrapers and tractor-scraper combinations from the side of a large hill at Visitation Point. The remainder of the material is hauled by truck from various locations in San Francisco. Average daily material moved amounts to about 9,000 cubic yards.

It will be some months before the final results can be determined, but if the experiment is completely successful, the fill will be extended all the way to Sierra Point. It will carry a freeway which will connect with San Francisco's Bayshore Boulevard and by-pass Brisbane and several business districts. Moses believes there are several areas in the bay district where similar conditions exist and this low-cost method of placing fills would allow many of the proposed construction projects to be completed at great savings in cost.

An International TD-24 crawler tractor and 21-yard scraper dump a load of shale and clay at the experimental fill project near Bayshore, Calif. The dark material at the right is mud squeezed up from the bottom of the bay by the settling of the new fill on top. Keeble Construction Co., San Jose, Calif., is the contractor.

Plastic Drawing Aid

A new type of drawing material which facilitates the making and reproduction of engineering drawings is announced by Di-Noc Co., 1700 London Road, Cleveland 12, Ohio. It is made of translucent Vinylite plastic rigid sheet, a product of the Bakelite Co.

Vinylite plastic rigid sheet will not shrink or stretch and is said to be resistant to moisture, grease, alcohol, and most chemicals. Finger marks and smudges wipe off with a damp cloth. Border, title, and information box, and grid lines are printed in reverse on the back of the sheet to facilitate drawing. Without hampering the draftsman, this printing reproduces clearly along with the drawing itself when the sheet is used as a negative. Stiff, yet pliable, Vinylite plastic rigid sheet lies flat or can be rolled up, and the company claims it resists wrinkling, cracking, fraying, and ageing. Erasures are easy to make, and entire drawings can be removed from a sheet, which can then be re-used.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 877.

Diesel-Combustion Handbook

The second edition describing its combustion system for diesels is being released by the Lanova Corp., 38-15 30th St., Long Island City 1, N. Y. The 58-page booklet tells in nontechnical terms the principles of the internal-combustion engine and gives a complete explanation of the Lanova controlled-turbulence combustion system, its purpose, features, and application to the diesel engine.

It includes an appendix of useful engineering information with tables, formulas, and factors.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 876.

GOLD WINCH

¾ TON CAPACITY
1001 USES!

Holds 100 Ft. 1/4-in. wire rope. Two speeds: 8.16 to 1 for heavy loads, 3 to 1 for fast operation. Electric steel, bronze bushed.

$33.00 less rope

$43.45 with 50 Ft. ¼-in wire rope.

GUARANTEED—five day return privilege. Send remittance with order and we pre-pay shipping. If your distributor doesn't have the GOLD WINCH, send for literature and information:

WRITE GOLD FOUNDRY & MACHINE WORKS
1616 S. Osage • • Independence, Mo.

THINGS MOVE FASTER when a "QUICK-WAY" is on the Job!

Reg. U. S. Pat. Off.

FASTER TO and FROM the JOB • 50 M.P.H. on the Highway

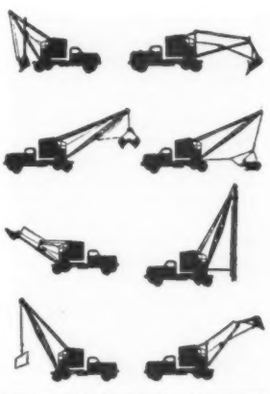
MORE WORK FINISHED ON THE JOB FASTER

You Make PROFITS FASTER

Job Tickets tell the story...*more hours of work each day...more work per hour...lower operating costs...lower maintenance costs*...it all adds up to *bigger profits for you.*

Yes, *QUICK-WAYS make faster profits*—give you fast truck speed between jobs—eight money making attachments—fast working speeds—4 models from 3 to 10 ton crane capacity.

—and quality construction too—all steel for strength and lightness—accurate balance—high capacity to weight ratio. More parts are interchangeable and easy to get at, which simplifies maintenance and repairs. All parts deliver their capacity rating and more. This fine construction means longer life—more profits on a small investment. They're economical to buy. Ask your distributor for a free demonstration.



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DENVER, COLORADO
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"QUICK-WAY" TRUCK SHOVEL CO.
Dept. 100—2400 East 40th Ave.,
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Please send me complete details on "QUICK-WAY" truck shovels—four different models for large jobs and small.

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The receding Mississippi leaves a thick deposit of inky black silt over a large part of the wharf construction area. These photos were taken one month apart.

Here a workman sluices the silt back into the river with one of five high-pressure water lines from the Port of New Orleans fire tug Deluge.

Port of New Orleans Gets More Wharf Area

Thick Silt Deposited by Record Rise in Mississippi River Poses Special Problem for Contractor

By ALBERT C. SMITH
Associate Editor

• AS part of a long-range development program, the Port of New Orleans is constructing another completely fireproof wharf along the east bank of the Mississippi. The $3,500,000 Napoleon Avenue structure will add valuable shipping facilities to the Port's 7 miles of public-owned wharves, grain elevators, and commodity warehouses.

When completed, the wharf will extend 1,000 feet downstream from an existing commodity-warehouse wharf. It will be 277 feet wide, including a 47.7-foot-wide shipside apron. Tracks of the New Orleans Public Belt Railroad will serve the wharf from the front apron and alongside the rear-apron roadway.

The front half of the wharf is composed of a concrete deck, structural-steel columns, and concrete footings on wooden piles. The piles are cut off at low-water level except at the levee section, where the cutoff conforms to the levee slope. The rear half of the wharf is similar except that substructure columns and beams are of reinforced concrete. Steel was used on the front substructure because this section of the wharf is actually in the river and a lower dead weight on the pile footings was desirable.

The wharf transit shed will be a one-story steel-frame structure 200 feet wide. It will be enclosed with galvanized corrugated-iron siding and steel rolling doors 24 x 14 feet in alternate bays. Bays will be approximately 67 feet x 33 feet. The roof will be 5-ply composite roofing with tar or asphalt and gravel surfacing laid on wood sheathing. Automatic sprinkler and standpipe systems, with hose connections and other necessary fire-prevention facilities, will be provided.

Farnsworth & Chambers, Houston, Texas, contractor, moved in on the foundation work in October, 1951. The first job was to remove an old timber-wharf structure and pull out the old piles. The structure was cut up, loaded on a derrick barge, and sent to a Port stockpile; the concrete deck was broken, and the pieces were later used as riprap on other projects. The old piles were extracted by a 100-ton derrick, reconditioned, and used over again by the Port in other areas.

Silt Removal

After the land portion of the site was cleared by bulldozers, the next problem was to remove the thick layers of silt on the levee slope so that piles could be driven and then cut off at the proper elevation. Every annual rise and fall of the Mississippi leaves thick layers of inky black silt all along the river bank, but Port engineers have a quick and easy way of getting rid of it. When not fighting fires, the fire tug Deluge, with a pumping capacity of 10,400 gallons per minute, pulls up along shore, sends 4 or 5 lines to the site, and then jets water to sluice the silt back to the river.

This operation is also conducted along existing wharves to prevent excessive buildups of silt around pile foundations. At one time, whole sections of wharf were pulled away when silt embankments slipped suddenly.

Pile Driving

Pile driving was done by two turntable rigs and one skid rig, using No. 1 Vulcan hammers in 75-foot leads. The skid rig operated from a barge. All rigs were powered by 60-hp oil-fired Clyde Dutton boilers. Piles were creosoted and ranged from 40 to 80 feet in length. The entire job required over 7,000 of them.

The contractor had estimated that a spring rise in the river would halt the driving of the forward piles, so he drove all the rear piles first, so that some concrete work could proceed even during the high stages. This planning paid off when the river came up sooner than expected, and stayed that way much longer than expected. In fact, after the river receded the silt had to be sluiced away again to expose the piles driven the previous fall. The high mark was about elevation 34, and when CONTRACTORS AND ENGINEERS MONTHLY visited the site, the level was 25. It dropped much more during the summer before full-scale work began again.

The sandy subsurface along the Mississippi banks provided more driving problems. About 50 per cent of the piles had to be jetted to obtain proper penetration. When a pile took over 60 blows per foot, a hole was first prejetted with a 3-inch pipe operating at 250 psi from a Gorman-Rupp pump. When prejetting couldn't do the job, the pile was driven and jetted at the same time. The average output was 25 piles a day with a high of about 45. Piles were cut off with a one-man Homelite saw.

A wood-sheet cutoff wall of creosoted pine was driven the full length of the levee. Each piece of sheeting was 10 inches x 6 inches x 16 feet long with a tongue-and-groove cross sec-

C. & E. M. & Port of New Orleans Photos

A Homelite one-man chain saw cuts piles off at proper level.

tion. This wall was driven by a No. 7 McKiernan-Terry hammer operating in swinging leads on a Byers crawler crane. All pile driving was kept 150 to 200 feet away from newly placed concrete.

Quantities and Personnel

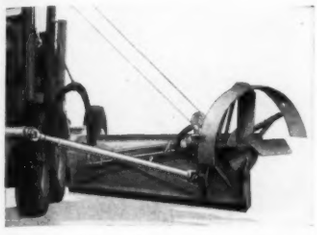
Concrete work will total 12,000 yards. For the footings and walls, 5½ bags of cement are used per yard of concrete. Decks and beams get 6 bags.

A batch plant about 1,000 feet from the site supplies aggregate to a Multi-Foote 27-E paver. Concrete is chuted into buggies and carted to the forms. Regular wooden forms are used on the footings, Universal forms on the deck and walls, and metal forms on the columns.

J. D. Lockwood is Field Engineer for the Port of New Orleans and C. A. Womack is Superintendent for the contractor.

Blower Attachment For Grader Snow Wing

A blower attachment for snow wings on Adams motor graders has been announced by J. D. Adams Manufacturing Co., Indianapolis, Ind.



As snow is delivered off the end of the snow wing, a 52-inch propeller blows it off the right-of-way. The Adams motor graders with V snow plows and snow wings equipped with the Snow-Blo attachment can completely dispose of snow falls as they occur. The wing with the blower can blow away snow banks built up by plows. The Snow-Blo is driven by a heavy-duty hydraulic motor; power is derived from the grader engine.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 930.

Lift-Truck Upright

A new upright for the Model 20 lift truck is available from Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg. Able to elevate the load without an increase in over-all height, it is used where there is minimum overhead clearance, and where the inner upright of a standard model would strike obstructions before the load could be elevated to the desired stacking height. Typical applications for the Model 20 with the new lift include loading and unloading boxcars and van trucks, and working under low doorways, ceilings, and balconies.

Upright assemblies are available in 7 foot 8-inch and 9-foot 8-inch lift heights. Uprights are also available on special order in lifts higher than 9 feet 8 inches.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 936.

Bottom-Dumps and Loaders

A revised 16-page catalog covering its 13-cubic-yard bottom-dumps and loaders has been issued by Euclid Road Machinery Co., 1361 Chardon Road, Cleveland 17, Ohio.

It lists the features and general specifications of the Models 70 and 71FDT-89W bottom-dumps and the 9 and 10BV loaders.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 905.

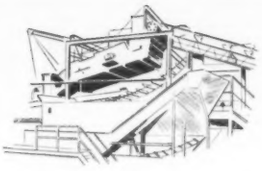
New Basic Mechanics Book

"Mechanics", a two-volume book covering the theory and application of basic engineering mechanics, written by J. L. Meriam, Associate Professor of Engineering Design at the University of California, has recently been published. Both volumes—Part I, "Statics", and Part II, "Dynamics"—are intended for use as college textbooks.

Progressing in easy steps from fundamentals to advanced theory, the author integrates the usual pre-engineering background of physics, mathematics, and graphics. The two volumes contain over 600 practical problems, taken from many engineering fields, with accompanying illustrations. Emphasis is laid on practical problems involving real situations. Each volume contains two prefaces, one addressed to the student and one to the instructor.

"Mechanics" is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York, N. Y. Parts I and II are priced at $4.00 each.

for reliable performance...



Torrington Spherical Roller Bearings compensate for shaft deflection and housing distortion caused by shock loads. Binding stresses are eliminated—efficient operation assured.

Already used as original equipment on construction machinery of virtually every type, these rugged bearings are becoming more and more popular for all service needs.

THE TORRINGTON COMPANY
South Bend 21, Indiana Torrington, Conn.
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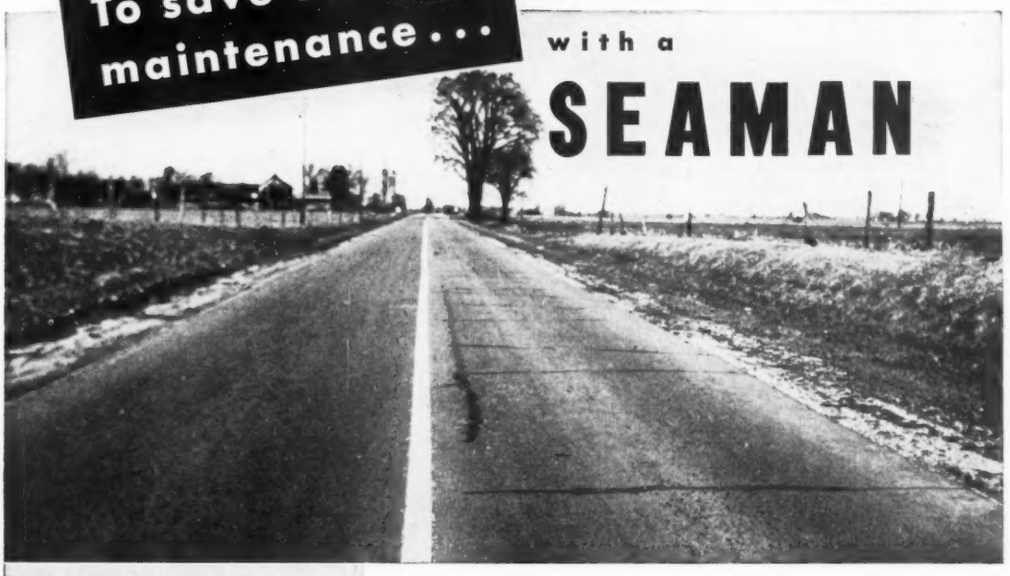
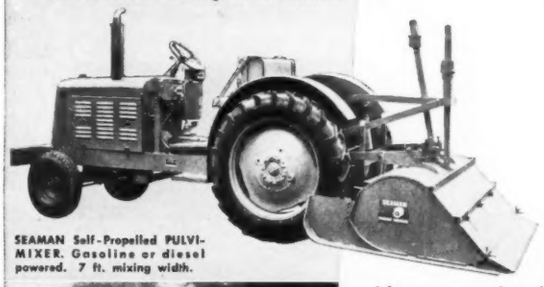
TORRINGTON SPHERICAL ROLLER BEARINGS

Spherical Roller • Tapered Roller • Straight Roller • Needle • Ball • Needle Rollers

To save surface maintenance... BUILD THE BASE with a SEAMAN



OLD 9 FOOT ROADWAY widened with crushed stone macadam. Bituminous surface (at left) covering SEAMAN-mixed macadam shows no defects after 2 years. Cracks in surface over old pavement (right) reflect cracks and shrinkage in the old base.



SEAMAN Self-Propelled PULVI-MIXER. Gasoline or diesel powered. 7 ft. mixing width.

SEAMAN Mixer mixing crushed stone for water-bound macadam base. An excellent type of road. Ideal for stabilizing sub-grade prior to laying concrete pavement.

★ This 20 page, illustrated SEAMAN Bulletin, *"Macadam Base Construction Methods"* is yours for the asking. Shows how modern methods can build strong, weather-resistant macadam bases quickly and economically. Send a post card requesting Bulletin 60.

MOST cracks and faults on a highway are a mark of insufficient stability in the base, sub-base or in both. Repairs simply hide the symptoms temporarily; they don't correct the cause.

Here's a case in point: a very old rigid type of roadway 9 feet wide, laid on a none too stable sub-grade, was widened by adding a crushed stone macadam base 11 feet in width. The stone was mixed, keyed and interlocked with the SEAMAN MIXER. In the same pass the SEAMAN also blended the fines to fill the voids more perfectly than by the costly, old method of hand-brooming. After pneumatic rolling the entire 20 foot roadway 8 miles in length was given a bituminous topping.

Two years later. The SEAMAN-mixed macadam showed no surface defects. (See left half of photo above) But the surface of the old road was badly marred by a series of cracks over the entire 8 miles. These faults reflect shrinkage, settling and cracks occurring in the original base.

The moral? Whatever type of construction you use — bituminous, soil-cement, macadam, gravel or any method of stabilizing soil, — build the base with a SEAMAN. Lowest in the original construction cost, it will pay back a hundred-fold in years and years of minimum maintenance.

SEAMAN MOTORS, INC.
282 N. 25th ST. • MILWAUKEE 3, WISCONSIN

Road Bulletins Good For Public Relations

Arizona Highway Dept. Analyzes Road-Condition Bulletins; Plans, Drafts, and Publishes Its Own

• BULLETINS of road conditions can be powerful instruments for good public relations if used properly. William E. Willey, Engineer, Division of Economics and Statistics, Arizona Highway Department, pointed this out at the annual conference of the Western Association of State Highway Officials.

Arizona, he said, recently became interested in providing these bulletins for the comfort and safety of its motorists. Starting from scratch, the Highway Department canvassed all states to determine the popularity of the bulletins and to get various viewpoints on how they could be used to the best advantage.

Road Bulletins in 46 States

Arizona found that though the titles of the bulletins, the conditions reported, and the methods of reporting vary, 46 states do disseminate some type of printed road information.

Titles are many. Some states use the word "detour" since they report solely on detours around projects under construction and washed-out bridges; other states veer away from "detour" (connoting deviation to a rough, rocky route) and prefer other titles, such as "Highway Condition Bulletin" and "Service Map".

What the bulletin publishes and the type of publication (generally base maps with covered overlays or typewritten pamphlets) vary with the state; when the bulletin is published, and how often, also differs, since some states prefer emphasis during the construction season, others during the winter months. Many of the bulletins contain information in addition to road conditions, such as speed limits, passing data, accident rates, current deaths, etc. All in all, it is interesting to note that 46 states *do* use some type of road bulletin, and that over 30 of them find it worth publishing at least monthly.

Arizona's Road-Condition Bulletin

Homework done, the Arizona Highway Department began on its own project. It chose "Road Condition Bulletin" as a designation because of its almost universal use. A standard size (17 x 22-inch) map showing highways on the state system, principal towns, and county lines was selected as a base drawing. Three symbols denoting pavement, gravel, and earth are used for surface classification. The standard symbols of the American Automobile Association are used in the legend for highway conditions. Since the state has no problem with spring thaws and break-ups, only four conditions are cited: road closed, construction—traffic maintained, road closed for winter, and detour around construction. During the summer an additional category is used for seal-coat operations. The only other figures are elevations near towns, road junctions, and summits for the benefit of motorists with heart conditions.

Improvements in surface types, realignments, and new routes are shown on a red overlay until the improvement has been completed. The changes are then made permanently on the original blue-line base map. All highway projects are noted, including construction on new survey lines, which, though it often does not affect the traveler, does show the travel bureaus and agencies where the state is building modern highways. Latest highway information is shown on the overlay and is printed in red over the blue-line base map.

The finished product is a map in red and blue with a scale of approximately 25 miles to the inch. All active projects are numbered in red and are explained at the bottom of the page. These explanatory notes include the project number, a brief description of the type of work, traffic routing and detour information, and approximate completion date of construction.

Gathering Data

Since the bulletin is actually a construction one, information is obtained by keeping up with current contracts. This is done by recording all contract awards and regular department releases. The four District Engineers bring to the State Engineer's meetings at the beginning of each month the latest progress details from the field and participate in a general discussion of the state-wide picture. Later on they are personally contacted for information as to (1) any force-account work done by state forces; (2) additional detours, and future or proposed detours; (3) revised completion dates on projects; (4) closing and opening dates of highways closed for the winter.

About the 7th of each month, the "Weekly Construction Reports" turned in by engineers in charge of various contract jobs are checked for the latest detour information. (Since much of Arizona's construction is on new alignment, the worn-out existing road often serves as a detour.)

The final check, which includes reviewing the data and making decisions on matters involving highway policy, is made with the Deputy State Engineer.

The bulletin is published on the 15th.

Drafting and Printing

The original base map for the bulletin is drawn with ink on tracing cloth from which a printing plate is made by a photographic process. Base maps are printed in blue ink on white paper. The conditions overlay and legend are marked with black ink directly on this blue base. In making the printing plate for the red overlay, the photo-engraver filters out the blue base map, so that only the black remains to make the red printing plate. Overlays for subsequent months are produced by revising the current bulletin. Obsolete condition notes are deleted by cutting them out or covering them with white paper; new condition notes are added with black ink or by pasting red cut-out symbols and numerals on the blue base. The projects which will be completed first are kept toward the highest numbers for convenience in revising the explanatory notes. These notes are cut on a Vari-Typer and revised each month as required.

The contract for printing is awarded on a three-month basis. This includes printing 1,200 base maps to be used at the rate of 400 per month. Overlays are made three times and printed each month on the base map. The maps are mailed with an Addressograph plate by the Highway Department. The actual publishing is done by the Division of Economics and Statistics—a logical place, since records on the status of road conditions are kept there for the Bureau of Roads.

The total cost of each delivered bulletin, including tabulating, drafting, printing, and mailing, is about 18 cents on the basis of a distribution of 400 per month. Hence, the entire process is relatively simple and inexpensive.

Distribution

In making an analysis of the state mailing list to show the types of groups interested in receiving the bulletin, the Department found that, tabulated on a percentage basis, travel groups and auto clubs comprise 46 per cent; the Arizona Chambers of Commerce and other state highway departments, 25 per cent; and the remaining 29 per cent —newspapers and magazines, individuals, Federal agencies and military, the Arizona Highway Department, and miscellaneous. Distribution is made to all states in the WASHO group and to others which have made specific requests to be included.

Whether presented via radio or bulletin, road-condition reports have a great influence on the motorist, and the data distributed *must* be absolutely correct. Otherwise the repercussions from merchants and towns along the routes on which travel has been temporarily discouraged are foreseeable and understandable.

Road-condition bulletins not only provide an effective public-relations medium but also serve the ultimate purpose of any state highway department—to enable motorists to travel through its state in safety, comfort, and with a minimum of delay. The bulletins present the facts simply to the motorists—that is, the department issues the printed advice, the suggestion. The choice of routes which the motorist travels is still his own decision, but at least the highway department has done its best.

Today Arizona is so sold on these reports that it advises their use as essential to *any* well rounded highway organization.

the Press and Ready You Cut Sling Costs!

Only Handbook of its Kind in the Sling Field. You just can't measure Tuffy Slings by the old sling standards. Because of the new characteristics and efficiencies developed in Tuffy's 9 part, machine braided wire fabric construction, all users of slings need this Sling Handbook to know the facts about lower sling costs through longer sling service. You can have it FREE for the asking. It gives you—

Factual Data On 12 Sling Types and On Various Types of Sling Fittings. That's right, all the working data—dimensions, weights, safe loads, standard eye sizes, tuck lengths, sizes and data on standard and special fittings, straight pull, basket, choker and angle hitches, simplified ordering procedure, etc., on 12 factory fitted and factory packaged sling types. Also there is valuable information on sling care and on braided wire fabric for rigging your own slings.

30 Illustrations of Sling Uses—help you determine the types to fit your sling jobs. Should none of the 12 factory fitted types exactly fit, then the handbook tells how our engineers develop special types for special uses.

Step by Step, Illustrated Instructions On Splicing Both Tuffy Slings and Wire Rope. Splicing the braided wire fabric of Tuffy Slings is made easy with visual instructions. And, to make the sling handbook doubly useful, it contains 24 pages of visual instructions on making 7 kinds of wire rope splices, attaching sockets, ferrules and thimble clamp. Efficiencies of wire rope attachments, as established by actual strength tests, are tabulated.

You'll find this Sling Handbook and Riggers Manual easy to use and highly useful. A copy is yours with our compliments. Simply fill out and send the coupon.

Tie a knot in a Tuffy Sling. Note its flexibility. Pull the knot tight—then untie it. See how readily the patented braided fabric straightens out again.

It's hard to do by hand without the aid of a vise. If you are able to kink a Tuffy, then see how easily the patented braided wire fabric straightens out without material damage.

Get FREE Sling Sample—See For Yourself All The Advantages of Tuffy Slings

To see how entirely different they are you just have to handle and try out a Tuffy Sling. That's why we have made up a supply of 3 ft. samples. Get yours and prove for yourself Tuffy Sling superiority. Fill out the coupon—It's FREE.

UNION WIRE ROPE CORPORATION

2260 Manchester Avenue Kansas City 3, Missouri

Please send FREE of Cost—

☐ Tuffy Sling Handbook

☐ 3 ft. Sample of Tuffy Sling

*Name*_____

*Title*_____ *Company*_____

*Address*_____

*City*_____ *State*_____

Giant Thermal Power Plant In India Nearly Completed

A vital part of "India's TVA" is now nearing completion. It is the huge Bokaro Thermal Power Plant on the Damodar River, a $35,000,000 project engineered and constructed by The Kuljian Corp., Philadelphia, Pa. This first high-pressure steam-generating plant in the Far East is part of a tremendous power program being undertaken in India with the help of funds secured through the World Bank, and with engineering and construction know-how supplied by the United States.

The first boiler was erected last February, and the first turbo-generator unit will be placed in commercial operation in December. The boiler will deliver 300,000-pounds-per-hour steam at 900-psi gage and 900 degrees F total temperature. The completed station will have a capacity of 240,000 kw, consisting of four 60,000-kw units. Thanks to its location near one of the world's largest strip coal mines, the plant will generate power at exceptionally low cost. An earth-filled dam or barrage is being built to provide a reservoir for cooling water. Also included in the project is a total of 477 miles of transmission lines with the necessary substations and auxiliary equipment.

A group of 17 engineers selected by the Government of India went to Philadelphia to be trained by The Kuljian Corp. in the operation of the new plant. These engineers have now returned to India and will undergo further training during the final stages of construction.

Hydraulic-Coupling Manual

A bulletin on its disconnecting hydraulic coupling has been released by Twin Disc Clutch Co., Hydraulic Division, Rockford, Ill. It presents diagrams of the Model HUD, explaining the fluid-dumping feature which disconnects the output shaft from the source of power. It illustrates cooling circuits and describes the Model HUD's ability to run at high rates of slip without overheating.

The bulletin includes a horsepower-range chart to aid in the selection of the HUD, which is offered in a 21-inch-diameter coupling size, ranging from 35 to 450 hp and in a 27-inch size, ranging from 65 to over 600 hp.

This literature may be obtained from the company by requesting Bulletin No. 500, or by using the Request Card at page 18. Circle No. 902.

Big Cuts and Fills For Real-Estate Job

The rugged hills above the Bel Air section of Los Angeles have been transformed into a new and desirable residential area. The earth-moving project, begun in 1950, involved larger cuts and fills than are usually attempted in real-estate developments—the largest fill amounting to 300,000 cubic yards, with a maximum depth of 42 feet.

Two years ago, there were no roads other than fire trails in the 850-acre tract. The Los Angeles contractor E. Steinkamp, Inc., used International TD-24 crawlers equipped with Bucyrus-Erie bulldozers to pioneer the access roads which were laid out in what will eventually be a permanent street alignment. The work required no blasting, as the ridge is composed of shale, sandstone, and fine, sandy soil.

Fills, however, were a problem. Besides the rugged terrain, layers and pockets of diatomaceous earth, a water-pellent and siliconized material, made compaction difficult. This fine soil made it almost impossible to get moisture into the particles for compaction purposes. To solve the problem, the contractor used a 2½-inch quick-coupling pipe and a hose for applying moisture to each fill. On the worst concentrations of the difficult earth, a TD-24 pulled disk harrows over the material, mixing it with sandy soil. Then, as another TD-24 pulled 40,000-pound sheepsfoot tamping rollers over the fill, the hose man sprinkled each 6-inch layer. After eight passes with the rollers, the job was completed. The compaction, constantly checked by technicians, tested at a higher rate (90 per cent of optimum density) than the original soil in place.

Compacting fills was the main problem on the Bel Air Highlands project near Los Angeles. It required big International TD-24's pulling 40,000-pound tamping rollers to attain a 90 per cent compaction in the diatomaceous earth.

In treating the fill slopes to resist the severe erosion in this region, a ¾-yard Northwest dragline removed the loose earth on the outside slopes (averaging 1½ feet in depth) and cut the slopes back to solid ground. California ice-plant or winter rye was seeded and city water-supply lines, used in compacting operations, furnished water for the plantings. Topsoil for the tract was obtained from canyons near Beverly Hills and the sea.

The new residential area is known as Bel Air Highlands.

Vinylite Tarpaulins

A new line of tarpaulins for protecting machinery and equipment is available from American Agency, 799 Broadway, New York 3, N. Y. They are made of Du Pont 10-gage Vinylite, and are said to be half the weight of duck tarpaulins.

According to the manufacturer, they are 100 per cent waterproof, crackproof, peelproof; resistant to abrasion, motor oils, and most chemicals; and will not warp or shrink after prolonged weathering and exposure to wide temperature fluctuations. The tarpaulins are also non-inflammable.

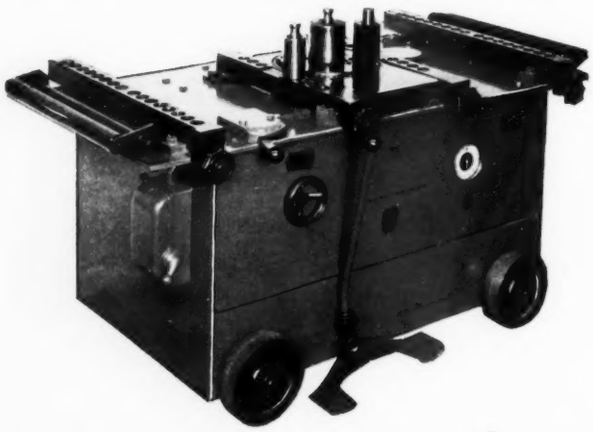
The Vinylite used is said to be long-wearing and tough, yet flexible and light in weight; its tensile strength is 200 pounds. It comes in sunproof opaque navy blue. Grommets are inserted at three feet intervals. The tarpaulins are available in sizes from 9 x 8 to 22½ x 22½ feet.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 901.

Goodspeed for Riddell

Bruce W. Goodspeed has been appointed Factory Representative in the southeastern states for W. A. Riddell Corp., Bucyrus, Ohio, manufacturer of Warco motor graders. He will work closely with distributors and owners of both the 4D-100 (100-hp) model and the new 4D-85 (85-hp) model.

Automatic... Bar Bending Machine



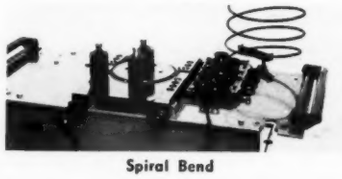
This new Bending Machine features all the latest improvements called for in modern fabricating methods. Right and left-hand bends can be made without additional adjustment by means of a single control lever.

The variable speed drive is easily adjustable to suit any thickness of material assuring high operating efficiency even when handling light stock.

Automatic stop and return control provides maximum safety and uniform work.

Special attachments permit the bending of hooks and angles on slab, truss or offset bars. Also will bend spirals, rings and curves of any diameter and pitch.

Stirrup Bend



Spiral Bend

Large Double Bend

Multiple Double Bend

These machines will be on display at the Concrete Industries Exposition Cleveland—Booth No. 50

KLINGELHOFER MACHINE TOOL CO.

INDUSTRIAL PARK, KENILWORTH, NEW JERSEY

Riggers PLAY IT SAFE on "high wire" jobs!

... that's why they demand GENUINE

CROSBY CLIPS

Drop-forged, hot-dip galvanized wire rope fasteners

SIZES FOR ⅛" TO 3" WIRE ROPE

DISTRIBUTORS EVERYWHERE

AMERICAN HOIST & DERRICK CO.
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Meet STRONG Competition with STRONGER, More Economical Concrete... Use

MALL Concrete Vibrators

Gain more advantages over hand puddling than ever offered before . . . through Mall Concrete Vibrators. Practical, engineered power that goes to work and stays, shift after shift, operating with a minimum of attention, producing stiffer, denser concrete that's more than up to strongest competition.

Models and features include: Gasoline, electric or pneumatic Mall models, all equipped with heavy-duty shafts and housings and full ball and roller bearing mounted Hi-Kik vibrator heads. Rugged gasoline 2 to 5 hp. models mount full-service attachments for surfacing, sanding, wire brushing, grinding, grouting, pumping and drilling . . . one power unit delivers bonus jobs.

Write today for the complete story about all Mall Concrete Vibrators.

More Power to the Pound . . . Less Pounds to Handle.

40 Factory-Owned Service Warehouses, Coast To Coast, To Serve Our Customers and Thousands Of Dealers.

Mall TOOL COMPANY

7743 S. Chicago Avenue
Chicago 19, Illinois

Clip and mail this CHECK LIST for details

Exhaust Protectors

An exhaust protector for keeping rain, snow, sleet, dirt, and insects, from entering the vertical exhaust pipes of engines of all types has been redesigned by Canton Mfg. Co., 2408-13th St., N. E., Canton 9, Ohio.

The Cancap is a lightweight cast-aluminum alloy fused around the top of a malleable tear-shaped hinge. This is said to afford the extra lightness to open with the first puff of the exhaust and gives the hinge long life. A wide opening action is obtained by using a cadmium-plated set screw with shakeproof washer as the pin of the hinge. Another feature of the protector is a malleable mounting bracket which slips over the pipe and is held by a cadmium-plated set screw. The Cancap needs no collars, clamps, or bushings. The smallest size fits 1⅜ to 2⅜-inch pipe. Four other sizes fit pipes up to 5 inches OD.

Further information may be secured from the company. Or use the Request Card that is bound in at page 18. Circle No. 855.

Bulletin on Welding School

An 8-page bulletin describing the Lincoln School of Welding has been published by the Lincoln Electric Company, P. O. Box 5758, Cleveland 17, Ohio. It lists the various courses given and the school's facilities.

Art Madson has been head of the school for 25 of its 35 years of continuous operation. The 35,000 men and women who have gone through the school in Cleveland have come from 19 different countries, some as far away as India and South Africa.

The school was started in 1917 when the United States Army purchased some welding equipment from Lincoln and specified in the purchase that Lincoln should train soldiers to be welders. Since that time the school has been turning out professional welders for industry at a rate averaging better than 1,000 a year.

The basic course at the Lincoln School consists of 4 weeks' training and practice with a new class starting every week. Lincoln conducts the school as a service to industry, and only a nominal charge for material is made. Advance courses in special welding techniques such as pipe welding and sheet-metal welding are also available.

This bulletin may be obtained from the company. Or use the Request Card that is bound in at page 18. Circle No. 927.

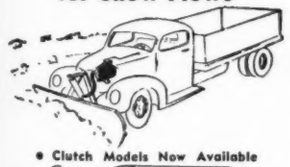
Another Conveyor Subway?

A belt-conveyor passenger subway is under consideration by Cleveland, Ohio. Patterned after the 3,300-foot subway now being studied by New York City to replace its Grand Central-Times Square shuttle (see C. & E. M., Sept., 1952, pg. 85, this system would pass under Euclid Avenue between Public and Playhouse Squares. There would be two intermediate stops.

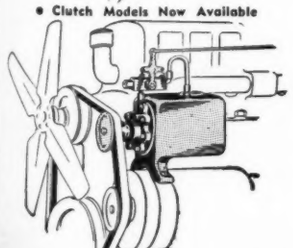
The design, by Goodyear Tire & Rubber Co., Akron, Ohio, calls for the use of small passenger cars riding on high-speed main conveyor belts and slow-speed belts at loading and unloading points.

With many states requiring trailers as well as trucks to be equipped with mud flaps at the rear, Rogers Bros. Corp. of Albion, Pa. directs attention to its design of sloping rear extensions. They are said to prevent the throwing of mud to the rear, permit easier loading, and provide additional carrying space. Circle No. 937 on the Request Card at page 18.

POWER HYDRAULICS
for Snow Plows



• Clutch Models Now Available



• THOUSANDS IN USE • FIT ALL TRUCKS • FAN BELT OR ELECTRICALLY DRIVEN MODELS.

• Write Hydraulic Division

MONARCH ROAD MACH. CO.
323 N. Front Ave., Grand Rapids 4, Michigan

The Surveyor's Notebook

Reporting on Unusual Surveying Problems and Their Solutions

Notekeeper: W. & L. E. Gurley, America's Oldest Engineering Instrument Maker

Doing Something about the Weather

"I quite agree with R. Getty Browning's recent statement in 'The Surveyor's Notebook'* that many phases of surveying have not kept pace with the increasing accuracy of instruments," writes L. Mabry Adams of Cleburne, Texas. "Weather is one factor which should be taken into consideration more often.

"For example, allowances can be made for the wind. Chainmen are carrying a weather vane while they are pulling the tape, *suspended,* since the resultant of the added pressure is felt by the direction and amount of sidesway of the tape from the vertical droop. Variables of pressures, angle of incidence, and flutter of the tape can all be cared for simultaneously in a correction of tension—derived by adding the product of the exsecant of the angle of sidesway *times* the tension of that portion of the tape used in still-weather measuring.

"When the sum of these reach the resultant of force of weight of the tape under the tension applied and directional force of the wind, the tape will begin a return swing—if not held by a steady pressure. Best results may be gaged by the maximum swing and tension coordinated at the instant of determination.

"Adopting such methods for Tension Control in Suspensory Measurements is an important adjunct to use of a good instrument. I grew up with, and have now been using Gurley Transits for 35 years. I have never found another transit I liked better on any job."

Near Cleburne, Texas, L. Mabry Adams' chaining crew snaps the sidesway in determining tension with wind allowances. Adams has used Gurley Transit 35 years.

Adams (at center of chained span) gives graduated offset-sight by horizontal measure as inspector (at stake beneath transit) applies tension to tension scale and reads awl-marked tack to nearest thousandth on temperature-scaled tape.

*Browning's plan for improving land survey records and all the other stories and surveying tips from the first year's "Surveyor's Notebook" series have been gathered together and reprinted in permanent booklet form. Write for a free copy of *"The Surveyor's Notebook"* collection.

When writing for your bound copy of "The Surveyor's Notebook" stories, ask also for Bulletin 50. It gives full details on Gurley instruments.

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W. & L. E. GURLEY, Fulton and Station Streets, Troy, N.Y.

Surveying and Engineering Instruments, Hydraulic Engineering Instruments, Standard Precision Weights and Measures, Paper and Textile Testing Instruments, Reticle Making Facilities, Aeronautical Navigating Instruments, Meteorological Instruments.

GURLEY
Surveying and Scientific Instrument Makers
Since 1845

Hot Radiography Cuts Weld-Inspection Time

A New Technique Eliminates Slow Temperature-Cycle Process When Testing Pipe for Flaws

By ALEXANDER GOBUS
Metallurgist
Sam Tour & Co., Inc., New York, N. Y.

• INSPECTION of welds in certain types of alloys by means of ordinary radiography techniques involves considerable waste of time and labor. An interesting new process by-passes this objection, yet furnishes equivalent analysis.

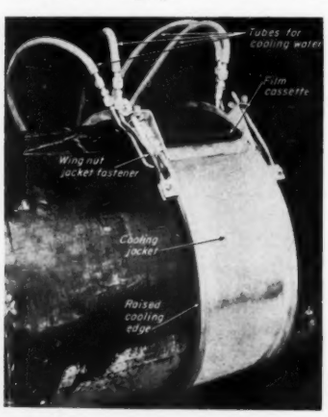
Radiographic inspection for flaws at progressive stages in the weld often saves removing an entire joint weld. However, the objection to the conventional procedure has been that the inspection in itself is a major undertaking. The difficulty is caused by time-consuming methods of radiographing a weld as hot as 600 degrees F with industrial X-Ray film vulnerable to temperatures higher than 100 degrees F. Thus, normally, the metal must be cooled before taking the radiograph. This involves a long process of post-heating to relieve internal stresses before the controlled cooling begins. After radiographing the cool weld, many more hours of preheating are necessary before welding can be resumed.

The new hot-radiographic technique, the McElroy-McNutt process, makes it possible to take weld radiographs without first having to cool the metal. The advantages of the method (licensed exclusively to Sam Tour & Co., Inc., New York, N. Y.) are most striking when it is applied to alloys that otherwise would require a cycle of postheat, controlled cooling, and preheat for each radiographic inspection. For example, hot radiography reduces by approximately 55 per cent the total time required to weld pipe joints in high-temperature steam lines.

Water-Cooled Jacket

The device that protects the film against high temperatures for pipe welding is the water-cooled jacket shown in the accompanying figure. It consists of two hollow-cylinder sections hinged at one end and fitted with wing-nut fasteners at the other. Piping connections provide inlet and outlet for the cooling fluid and a rubber hose allows the fluid to circulate smoothly through both hollow members. The hollow raised sides of the jacket help maintain an even temperature distribution along the surface that comes in contact with the film cassette. Flexible cassettes containing film fit snugly between the raised jacket edges and are held in place with heavy-rubber retaining bands.

When a radiograph is to be taken of a hot pipe weld, the jacket is placed between the induction-heating coils and clamped around the pipe. After water has circulated several minutes, three cassettes, covering the circumference of the pipe, are fastened in place. Gamma radiation from a source held at the center of the pipe penetrates the weld and forms an image of its structure on the film. The whole operation is conducted at preheat temperature, and welding need be interrupted for only about 30 minutes depending on the thickness of the weld and the exposure time required.



The McElroy-McNutt hot-radiographic technique features a water-cooled jacket. The process is described in the accompanying article.

The radioactive material is held at the center of the pipe by a special jig. The arm of the jig fits through an opening near the weld. When the joint is completed, a plug of the same alloy as the pipe is screwed into the opening and welded to the outer pipe surface. Other methods of introducing the gamma ray are used when the weld is near a pipe end, but the jig arrangement allows accurate positioning of the source when other arrangements are not applicable.

Use of the cooling jacket increases the distance between source and film by approximately ½ inch; it introduces two thin sections of steel before the film; and it adds a layer of water that must be penetrated by the radiation. These factors have no observable effect on the radiographs and are permitted by code regulations. Penetrameter sensitivity with the new method is at least 2 per cent. This accuracy is equal to that of the conventional method and is easily within the requirements of the ASME Power Boiler Code (Paragraph P 102).

Comparison of Methods

Comparison of the hot-radiography process with ordinary technique is provided by numerous applications of both methods to pipe welding in power plants. In one of the modern plants where hot radiography was employed, the piping was designed to carry steam at 1,050 degrees F and 1,500 psi. To withstand the high temperature and pressure, this pipe was made of steel alloyed with 2¼ per cent chrome and 1 per cent molybdenum. The alloy pipe, requiring close dimensional tolerance and careful inspection, was 3 inches thick with outer diameter of 17 inches. Preheat temperature maintained by induction-heating coils was 600 degrees F; temperature for stress relieving was

New ¾ yd. shovel, in standard-duty and heavy-duty models.

New 20 ton, heavy-duty truck crane, especially designed for long boom work.

Designed to Combine These Outstanding Features . . .

- **INSTANT MANUAL CONTROLS** give a positive, smooth "feel" of the machine. Operator maintains a steady working pace.
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- **INDEPENDENT CHAIN CROWD** is powerful and positive, gets full engine power into the crowd . . . also many other features designed to insure efficiency at minimum operating expense.

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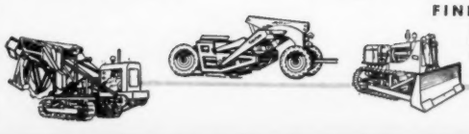
Construction Equipment: Excavators, Scrapers, Dozers, Ditchers, Spreaders, Finegraders, Truck-mounted Road Graders. Truck Equipment: Dump Truck Bodies & Hoists, Winches & Cranes, Refuse Collection Bodies, Elevating End Gates.



1,300 degrees F. Such pipe is sensitive to fabrication methods, especially thermal shock due to the rapid change in temperature.

By the ordinary method of cooling the weld before radiography, the stress-relieving cycle consumes at least 32 hours for each radiograph. In spite of the time loss, it is considered necessary to make at least one intermediate inspection to avoid chipping out a complete weld when, for example, a flaw might be near the root.

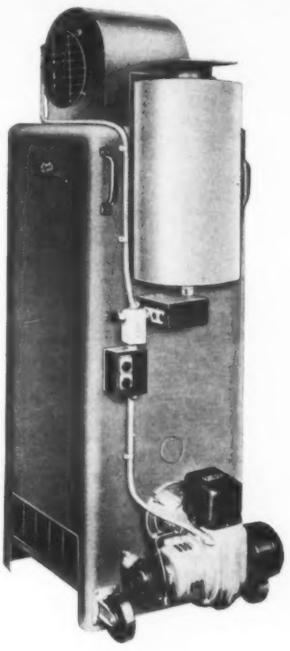
Using the new method, the first intermediate inspection of this typical pipe joint was made after completing ¾ inch of the weld. Early inspection of the weld base is advisable because flaws are most likely to occur at the root of the weld. The cooling jacket for this joint was 17½ inches in diameter and 6 inches wide. It was clamped into position as soon as welding stopped. After water had circulated for a few minutes, the cassettes were fastened into place and the film exposed. Welding was continued as soon as the exposure was completed. This time-saving procedure is advisable only with hot radiography because there are no temperature-cycle procedures to observe. In the above-mentioned case, total welding time was cut by 94½ hours.

No flaws occurred in this particular joint, therefore it was not necessary to chip or grind the weld. Radiographs were taken and analyzed after completing each inch of weld so that a minimum of metal would have to be removed in case flaws were discovered. If flaws occur, the joint is kept at the preheat temperature during chipping to eliminate taking the pipe through a temperature cycle to remove a defective weld.

The new process has been used with similar time-saving results on welding jobs other than pipe. If the surface to be radiographed is not cylindrical, special cooling fixtures can be designed. Many new applications are therefore likely to be found for the basic principles of hot radiography.

A New Heat Machine

A new 168,000-Btu heat machine with an adjustable vent for permanent installation or portable on-the-job use is announced by the Fageol Heat Machine Co., 5725 Mt. Elliott Ave., Detroit 11, Mich.



The Model VO-168 operates on the counterflow principle of spraying heated air out across floor areas to form a 6-foot-high blanket of warmth in the work zone. According to the manufacturer, this principle of heating from the floor up avoids wasting heat in unused overhead areas. The new unit is said to heat men at work, not empty spaces.

When used with a flue and vented outside, Model VO-168 may be used in confined areas and the heat output vented is 130,000 Btu per hour. When used without a flue, free heat is directed back into the blower and discharged "superheated", increasing output to 168,000 Btu per hour. Unvented, the new machine is recommended for on-the-job use. Equipped with wheels for easy portability, it can also be used for de-icing wheels and transmissions, and drying plaster, paint, and concrete.

Model VO-168 operates from a detached fuel supply, burning No. 1 or No. 2 fuel oil, kerosene, or diesel oil. A 10-gallon fuel tank may be attached to the unit as optional equipment. Dimensions of the machine are 21 x 33 x 69 inches. Weight is 345 pounds. Burner is UL-approved gun-type pressure-atomizing. The machine can be started or stopped by snapping switch.

Further information may be secured from the company by requesting Bulletin L-5391. Or use the Request Card at page 18. Circle No. 875.

Torque-Converter Data

A bulletin describing its hydraulic torque converters has been issued by The Torcon Corp., 1201 W. 5th St., Ashtabula, Ohio. It cites features and includes a selection chart for determining the correct converter size for a particular application.

The transmissions are single-stage three-element-type units which combine a hydraulic torque converter and a hydraulic coupling. They range from 11 to 26 inches in wheel diameter and can be used with gasoline or diesel engines rated from 30 to 600 hp.

The torque converters covered in the booklet are applicable to such equipment as shovels, cranes and draglines, logging machinery, road machinery, and tractors. The bulletin includes photographs of several types of equipment using the converters, along with closeup views showing the converters mounted on the engines of the machine.

This literature may be obtained from the company by requesting Bulletin No. TC-649, or by using the Request Card at page 18. Circle No. 920.

Shovels

Gar Wood's 75 Series shovels are new to the civilian market although hundreds are in use by the armed forces . . . Three base machines are offered. The 75A, a standard duty ¾ yd. model; the 75B, heavy-duty ¾ yd. model and the 75BT, 20 ton truck crane.

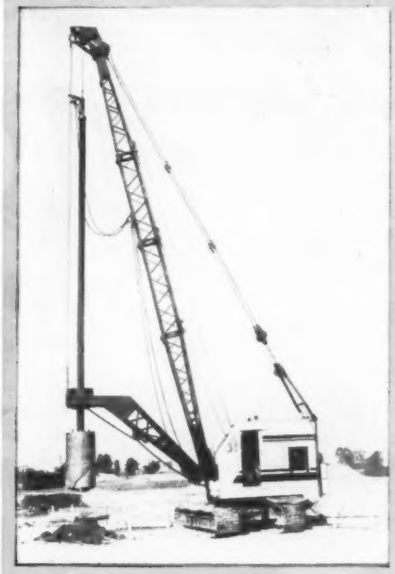
All models are easily convertible *in the field* for shovel, lift crane, clam, dragline, magnet, trench-hoe and pile driver work. *Only* Gar Wood offers the new Foundation Borer, an attachment that opens an entirely new source of profit to power excavator operators. A few Gar Wood features are listed below. Check your Gar Wood shovel distributor for full information.

and TRUCK CRANES

New crane with standard 35 ft. boom . . . 75A lifts 16,500 lbs., 75B lifts 21,200 lbs. on 12 foot radius.

GAR WOOD INDUSTRIES

No. 523



New FOUNDATION BORER

A Gar Wood Exclusive! Combines belling and boring for caisson holes into one operation for faster, cheaper construction of foundations.

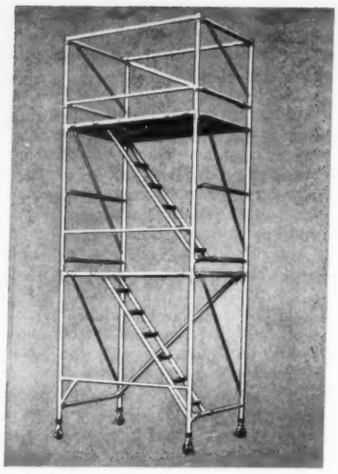
New TRENCH HOE

¾ yd. dipper capacity with 3 other optional dippers. Digs to 17'10" depth with a cutting width of 39½".

Folding and Rolling Aluminum Scaffolding

A folding aluminum rolling scaffold said to be easily erected and carried has been announced by The Patent Scaffolding Co., Inc., 38-21 Twelfth St., Long Island City 1, N. Y.

Fold-A-Way scaffold is made up of tubular frames, with end frames hinged in such a way that the scaffold opens sideways with no member swinging more than 90 degrees. This permits one man to erect or dismantle the base section while standing within the base area, and prevents danger of collapse during erection. One man can erect the base section in less than a minute, claims the company. Base, intermediate, and top sections are all preassembled, have no loose parts, and unfold as described.



Fold-A-Way scaffold includes an internal stairway for ascension, and adjustable Lokt-Ring legs on the base section for use on uneven footing. For moving the scaffold after erection, the legs are fitted with casters, which have a simple lever control for locking both wheel and swivel securely. Coped joints are fully welded for maximum strength, and adequate bracing is used to insure rigidity.

The lightweight scaffolds are available in base sections, full and half intermediate sections, and guardrail top sections, permitting them to be built up to required heights. Where desired, base sections may be fitted with intermediate or top sections of standard aluminum rolling scaffolds without adaptation or adjustment. The Fold-A-Way is offered in addition to the manufacturer's aluminum sectional rolling scaffolds.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 866.

Diesel-Engine Bulletins

Twelve 2-page specification sheets on its Type 4FS one, two, and three-cylinder diesel engines are announced by Nordberg Mfg. Co., Chase and Oklahoma Aves., Milwaukee, Wis. They give complete engine specifications, equipment data, and outline drawings of various engine models.

The 4FS diesel engines are of the heavy-duty 4-cycle type built with 4½-inch and 5¼-inch stroke and rang in power from 10 to 45 hp, 1,200 t 1,800 rpm. They are offered as com plete, self-contained, ready-to-operat electric generator sets and centrifugal pump units, with clutch or stub-shaft power takeoff.

This literature may be obtained from the company by requesting bulletins 208 through 219, or by using the Re quest Card on page 18. Circle No. 91

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LINE OF CONTRACTORS TOOLS
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DEMOLITION TOOLS
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PAVEMENT BREAKERS

All STRUCTO tools are made in the modern Arrow shops by skilled tool makers using only the finest quality steel.

In addition to the tools shown above the STRUCTO line includes air hammer tools, star drills, drift pins and pull pins. All are available in a wide variety of sizes and weights.

Every STRUCTO tool is backed by 37 years experience in making fine tools, plus a generous amount of good service to customers.

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. . . because it gives you all these advantages . . .

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- SEACO contains 95% metal — only 5% coating. More metal for your money.
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Use SEACO over MANGANAL
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While the ground is frozen!
NO CROP DAMAGE • NO MUD • BETTER PUBLIC RELATIONS

PENGO EARTH AUGERS

★ Twin helix—no back thrust!
★ Bores true, clean holes in any soil, most sandstones and hardpans, frozen ground, permafrost!
★ All wearing parts replaceable on job!
★ Made in 15 sizes, 10" to 54" hole diameters, to fit all makes of heavy-duty earth boring machines. Larger sizes on order.

PENGO CUTTING HEADS

★ Easy installation — welds to your present helix.
★ Bores where you never could before!
★ Wearing parts replaceable on the job, interchangeable with PENGO Auger parts.
★ Made in 9 sizes, 8" to 24" diameters. Larger sizes on order.

PENGO ANCHOR AUGERS

Specially designed to bore holes for expanding anchors. 3-flight helix carries dirt out fast — completes hole with half the usual trips down and up! In 9", 11" and 13" sizes for 8", 10" and 12" anchors. Parts and features same as PENGO Augers.

PENGO BUCKET CUTTERS

Fast-digging PENGO Auger helix to weld to your present bucket bottom hinge. Available for buckets 16" through 36" in diameter. Offers same money-saving features as PENGO Augers.

"Get the PENGO WISDOM TOOTH*

It knows how to bore holes"

Quick-replaceable, drive-on *PENGO Wisdom Teeth are cast from special abrasion and shock-resistant steel alloy; give far longer service life! Used on all PENGO Augers and Cutting Heads.

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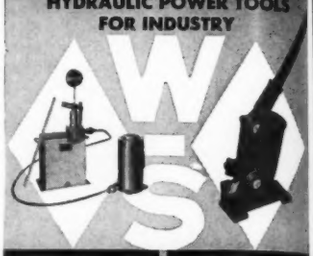

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These sturdy units, with either independent or integral pumps, are useful for many jobs in construction and maintenance. Capacities from 20 to 500 tons.

W-S wire, cable and bar shears provide years of trouble-free general service. They are light and portable for convenient on-the-job use.

PORTABLE PIPE BENDERS | HAND PUMPS

Bends all standard, extra heavy and double extra heavy steel pipe from ⅜ in. to 2 in. inclusive, as well as standard weight pipe up to 3 in. diameter. Also handles solid mild steel bars up to 2 in. diameter.

Single and double plunger types, with reservoirs of different capacities to suit the job, these hand pumps have a wide application for operating small hydraulic tools, jacks and other hydraulic equipment, and for general hydrostatic testing purposes.

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See page 106

Basement Sash Forms

Steel basement sash forms for poured concrete walls are made by The Steelcraft Mfg. Co., Blue Ash Road, Rossmoyne, Ohio. The form operates in the following manner. The basement sash is locked into the steel form. The loaded form is then nailed to the wood foundation forms and is ready for the pouring of concrete. After the wood forms are removed, the steel form can be easily taken out by loosening the thumb screws and tapping lightly with a hammer. The window remains in place in the poured wall.

The company reports that this method results in lower installation cost because it speeds construction and the forms may be re-used indefinitely. In addition, the forms assure perfect fit with proper clearances for operation of the basement sash and eliminate any possible leak in mortar joints.

Forms are made of heavy-gage steel, bonderized with a baked-on coat of paint. They are available for all three standard sizes of basement sash. A 2 or 4-inch extension may be attached to the standard 8-inch wall for use in 10 and 12-inch walls.

Further information may be secured from the company. Cr use the Request Card at page 18. Circle No. 857.

Bulletin on Rear-Dump

A 28-page booklet describing the Tournarocker, a rear-dump for off-road and highway hauling of dirt, rock, and ore, has been issued by R. G. LeTourneau, Inc., Peoria, Ill.

Action shots and cutout photos of integral parts of the machine illustrate how and why it hauls anywhere, cuts weather delays, reduces maintenance, speeds loading, and saves spotting time.

The catalog points out that the Tournarocker is available in 9, 18, and 35, or 50-ton custom-built capacities. Features cited include fingertip-electric-control system, 90-degree turning ability, instant shift transmission and torque converter, and large tires.

This literature may be obtained from the company by requesting Bulletin TK-137, or by using the Request Card at page 18. Circle No. 904.

Business Course for Engineers

A new condensed business course designed for engineers and other specialized executives who feel the need of training in general business administration, has been announced by the International Correspondence Schools of Scranton, Pa.

Included in the twenty lessons are: Economics of Business, Forms of Business Organization, and Office Management; Commercial Law; Financing of Business; Personnel Organization, Organized Training, and Collective Bargaining; and Report Writing. An estimated 350 hours of average study time is required to complete the training.

Says Acting Dean John C. Villaume, the course is available "both to individual students and to employers who wish to provide specific training."

Tools, tires, axles, and many other parts and equipment needed to keep trucks on the job, are carried in this International L-120 truck with Aristocrat Service-Utility body. The small parts are stored in horizontal and vertical enclosed compartments, while larger equipment is carried in the open pickup body section. For further information, circle No. 939 on the Request Card at page 18.

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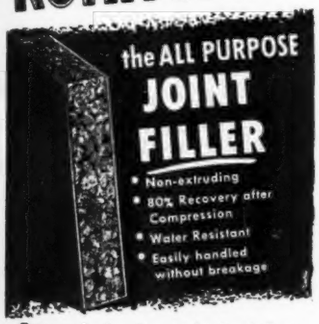

Composed of cork granules bonded together with asphalt between two sheets of heavy asphalt-saturated paper, KORK-PAK is the lowest cost, non-extruding joint filler on the market. KORK-PAK is readily handled without breakage . . . and when used in conjunction with Para-Plastic Joint Seal, always provides complete joint filling and protection.

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*KORK-PAK *is one of the many Patented products developed for the Construction Industry by Servicised Products Corp.*

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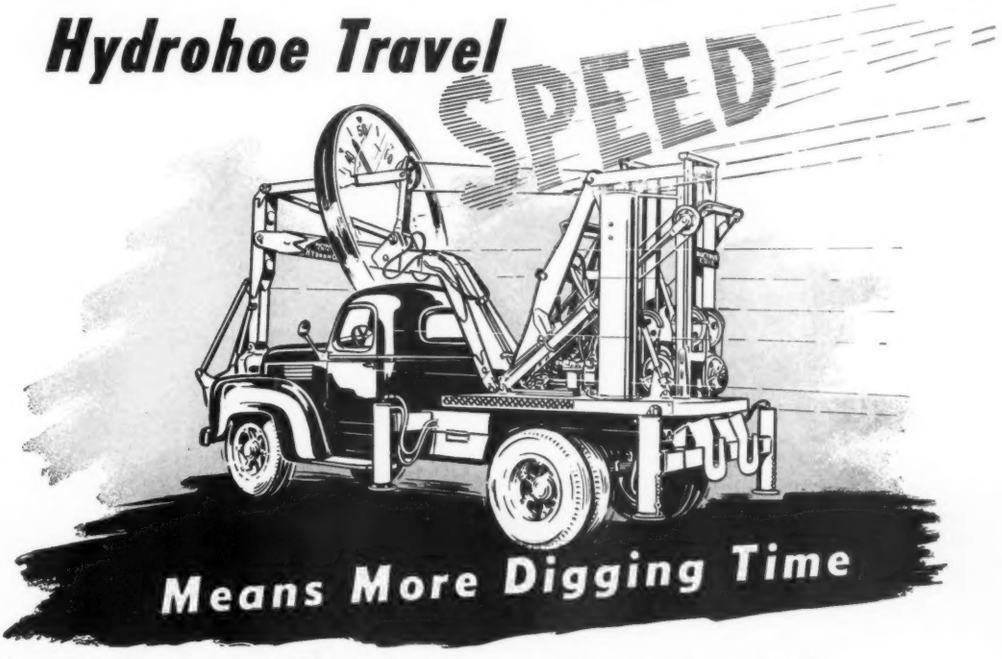
Hydrohoe Travel SPEED Means More Digging Time



This fast-stepping, all-hydraulic Bucyrus-Erie Hydrohoe moves in traffic as easily as your automobile — zips along open highway at speeds up to 50 mph — sets up in three to four minutes — and is ready to take off in equally short order after the job is finished.

Telescoping boom is fully retracted and fits snugly over cab on a strong brace when in travel position. There's no unwieldly extension sticking out to slow down the Hydrohoe — or imperil other traffic. Notice the crane's low super-structures — this speedster slips right through underpasses as low as 12 ft.

With such speed and agility in traffic, the Hydrohoe can handle a number of trenching jobs at widely separated locations — all in a day. In addition, the Hydrohoe's superior maneuverability makes it the natural choice for close quarter digging.

Speed is only one of many Hydrohoe advantages. Equally important is the way the hoe can be converted to crane front-end in the field in as little as four man-hours. Send the coupon for full details.

Here is the Hydrohoe in action. Every work function fully hydraulic. Available with 18- or 12-inch wide dipper. The only dragshovel with *TWO SEPARATE DIGGING ACTIONS!* The first is the conventional dragshovel digging arc. The second—a leveling and smoothing stroke — is obtained by telescoping the boom.

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Rugged Grading Job Extends State Road

Contractors Rip Out 2,000,000 Yards of Rock and Dirt for 15½-Mile Addition to Kansas Highway 18

• IN most sections of Kansas, level farm and cattle-raising lands stretch nearly as far as the eye can see. The terrain changes, though, in the northeast area of the state, and here it's a rugged rolling countryside. All but the main roads sweep up and down over hills, or loop around the sidehills. Those roads were built many years ago when the farmer didn't mind pushing his Model T up the steep grades or taking a few extra minutes to follow the slope of the land. Now the highway user calls for and gets flat easy grades, long sight distances, and short cuts.

The 15½-mile extension of Kansas 18, east of Junction City, is a case in point. It slices through the hills and ridges in deep cuts, and runs on high fills in the valleys. That meant a lot of heavy grading. Excavation quantities ran over 2,000,000 cubic yards—more than half of it rock.

Work on this project proceeded under three separate contracts awarded by the Kansas State Highway Commission. T. F. Marbut, Emporia, Kans., held the contract for 3.7 miles just east of Junction City; List & Clark Construction Co., Kansas City, Mo., held the 4.5 and 5.7-mile sections farther to the east. Both outfits had good-sized fleets of earth-movers and plenty of rock equipment, though heavy rains and flood waters made dirt-moving a stop-and-go proposition in some areas. The grading contracts, let between February and May of last year, were finished up early this summer.

"Crow-Flight" Shortcut

Kansas 18 runs a nearly straight line across the north-central third of the state, from Damar at the west to Junction City at the east. The State Highway Commission plans to extend it straight east of Junction to tie in with K-10. The contracts let thus far carry the extension as far east as K-13, a north-south roadway about half-way between Junction City and the tie-in with K-10, which goes into Topeka. Paving contracts let early this summer include the three grading sections (14 miles) and 1½-miles of concrete pavement on a previously graded section joining Junction City with new work.

The standard grading cross-section has a 44-foot roadway—a 24-foot pavement with 10-foot shoulders. Top of crown is 0.98 foot above shoulder height. Shoulders slope 4 to 1. The fill and backslopes are 4 to 1 in most sections. In rock cuts the backslope is ¼ to 1; in shale it's 1½ to 1. Where guardrail is specified, the fill is allowed to drop away at a 2-to-1 slope. Ditches are 3 feet below the shoulder grade and have an 8-foot bottom.

Maximum grade on the new road is 4.0 per cent. In sections where the grade is 3.5 per cent or steeper, the roadway is widened to 56 feet to provide an additional 12-foot "creeper" lane for trucks on the approach sides of such hills. Widening is effected through 200-foot transition sections at the bottoms and tops of the hills.

Pavement for the new highway will be a 9-inch-uniform concrete slab reinforced, on a 4 to 6-inch granular subbase. Minimum sight distances are 650 feet; no passing will be permitted where the sight distance is less than 1,000 feet.

In all, the project will cost about $2,600,000. Financing is included under the Federal-Aid program on a 50-50 basis. Low bids on the grading contracts were $145,000, $487,000 and $504,000 for the 3.7, 4.5, and 5.7-mile sections respectively. Three bridges for the project were let under separate contracts. Two of these—one 100.5 feet long, the other 173.7 feet long—were built by Universal Bridge Co., Kansas City, Mo. The third bridge, 303.3 feet long, was constructed by List & Clark.

Breaking the Rock

The major portion of the rock excavation, 1,086,000 yards, lay in the two grading sections held by List & Clark. The contractor worked the sections as one job, starting at the east end and moving west toward Marbut's section.

Four lightweight Joy wagon drills did the lion's share of the drilling. They were fitted for 7-foot steel changes and equipped with 2¼ and 2⅜-inch Joy throwaway bits. A 1,200-cfm Joy and a 500-cfm Gardner-Denver

C. & E. M. Photo

T. P. Marbut's "workhorse" on the contractor's stretch of Kansas 18—a twin-diesel-engine Euclid scraper with a 24-yard capacity.

Before you buy any mixer check KWIK-MIX

MOTO-BUG® . . . labor-saving power wheelbarrow takes all heavy manual work out of hauling, backing up, spotting, has full power forward and reverse . . . no push, no pull necessary. 10 cu. ft. hopper converts to 1500-lb. flatbed, fork lift, scraper blade.

✓ **ADJUSTABLE, DOUBLE-CONTACT SHAKER** on skip, with contact at each end of skip frame, has vertical shaking action. No twisting strain.

✓ **AUTOMATIC WATER SYSTEM,** accurate to fraction of a pint, combined with exclusive blade-and-bucket re-mixing action, produce consistent quality concrete every batch.

✓ **8-SECOND DISCHARGE** . . . tilted Flow-Line Discharge Chute, available only with Kwik-Mix, reaches deep into drum, discharges full batch in 2½ revolutions, saves seconds every batch.

✓ **INTERCHANGEABLE** side or end discharge . . . mixer can be changed from side to end discharge in less than an hour, because axles are easily interchangeable on square frame.

✓ **3-POINT SUSPENSION MOUNTING** on heavy coil springs (2 at each corner of rear, and 1 double-coil arrangement centered at front) absorb high-speed operating and travel shocks.

✓ **HEAVY CAST-STEEL DRUM HEADS** with machined roller paths . . . independent engine clutch . . . multiple V-belt drive . . . Tower Loader for overhead discharge . . . special 90" skip, are other 16-S features worth checking.

Before you buy any mixer, get all the facts from your Kwik-Mix distributor on this big-production 16-S Dandie. Other sizes: 11-S, 6-S, 3½-S . . . also, bituminous, tilting and non-tilt plaster-mortar mixers, and Moto-Bug.

To KWIK-MIX Co., Port Washington, Wis. Send new catalog on 16-S Dandie, also:
NAME ☐ 11-S ☐ 6-S ☐ 3½-S
COMPANY ☐ 10 ☐ 14 ft. bituminous
STREET ☐ 6 ☐ 10 ft. plaster-mortar
CITY, STATE ☐ Tower Loader ☐ Moto-Bug
CEM

KOEHRING PRODUCT

KWIK-MIX
COMPANY • Port Washington, Wis.
(Koehring Subsidiary)

compressor, operating in tandem, fed a steady supply of air to the drills through 1½-inch-diameter rubber hose. The Gardner-Denver rode on a standard 4-wheel carriage. The large-sized Joy was mounted on a special shop-made carrier. A Cat D8 pulled it on the long hauls while a little Cat 40 was sufficient for pushing the rig around on the bench.

List & Clark blasted out the rock in 8, 12, and 16-foot lifts. Hole spacing was varied, according to the depth of ledge and other conditions, from 7 x 4 to 9 x 5. Average rate for the four drills was somewhere around 250 12-foot holes in a 10-hour day.

Blasting methods varied with conditions encountered. A major portion of the blasting in Florence limestone was done with a bulk free-running 65 per cent dynamite primed with 40 per cent gelatin. This was used only when conditions were dry, since bulk dynamite is not suitable for wet conditions. The power factor was also variable, the average being somewhere near ¾ pound per cubic yard. Blasting was done with a 440-volt Caterpillar generator set, with blasts up to 800 holes. Three delay-cap series (50, 100, and 150's) around the edges with instantaneous exploders in the main center portion gave a good heave and reduced overbreakage of the cut slopes.

C. & E. M. Photo

An Allis-Chalmers HD-20 pulling a Malcom heavy 3-tooth ripper on a section of K-18 for which List & Clark had the contract.

The setup was varied in some areas. A Gardner-Denver tower drill handled some of the 16-foot lifts. The advantage consisted of starting right off with a 16-foot steel. In shale areas the contractor used two Hardsocg portable augers. The 6 and 12-foot auger sections were fitted with replaceable tips. A 15-hp engine, an Onan or a Wisconsin, supplied the power.

Marbut's section had only about 63,000 yards of rock, so the drillers were able to handle it with a Cleveland wagon drill and 3 hand-held Chicago-Pneumatics. A Joy 310-cfm compressor supplied the air. Holes varied from 2 to 8 feet deep. Spacings were 4 to 8 feet in each direction. Marbut used Hercules 40 per cent dynamite, all sticks, at the rate of 4 to 10 per hole depending on the depth and strength of the rock. A hand generator supplied the power for electric firing. Delay caps at the edge pulled the blast away from the backslope.

Chewing It Out

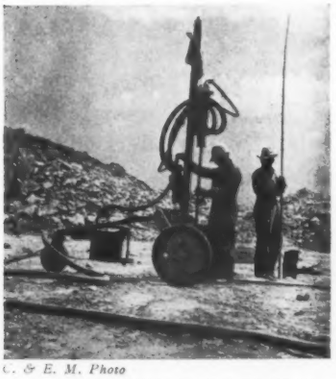
List & Clark used two Northwest 80-D's to chew out the broken rock. One had a standard 2½-cubic-yard bucket, and the other had its 3-yard bucket widened with an 8-inch plate down the middle. The shovels worked separate faces, each loading Euclids. The 10 bottom-dump "Eucs" held 13 yards and worked over an average 1,200-foot haul. This was upped to 2,000 feet or more, though, at the big cuts—one of which was 70 feet deep for about 500 feet. Four 7-yard Koehring Dumptors also saw service when the rock chunks were too big to handle with the bottom-dumps. A Cat D8 at each working face dozed a steady supply of side spill from the pile over to the shovels to keep them operating at peak capacity. They also "brushed" rock clear of the wagon line to save tires. D8's on the fill kept the rock at 2-foot-maximum lifts, and gave an assist to any driver who spilled too big a load at one time and found himself riding the hump.

Marbut's outfit also had a Northwest 80-D working the rock pile. Three Euclid 15-yard end-dumps handled all the shovel could pull out in hauls up to 2,000 feet. When the hauls got longer, a couple of rubber-tired Cat DW10 scrapers were added. Production on the shovels ran about 200 yards per hour. Both contractors used Caterpillar No. 12 graders to keep the haul roads in top condition.

Dirt-Moving

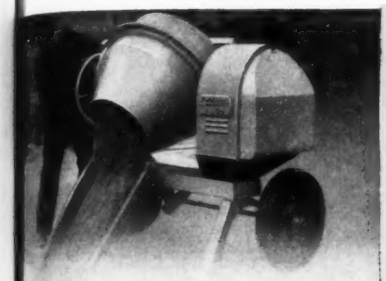
A new twin-engine Euclid scraper with a 24-yard-capacity was the workhorse of Marbut's fleet of earth-movers. He also had two Cat DW10's, a La-Plant-Choate, and two Cat Model 80 scrapers. The last three handled 16 yards apiece and were pulled by D8's. Marbut kept these on the short-haul dirt-moving—400 to 500 feet. He used the "Euc" on the longest hauls—some up to 5,000 feet. It averaged 100 pay yards per hour on this job. The other rubber rigs handled the in-between hauls. Dirt excavation on this section

(Concluded on next page)



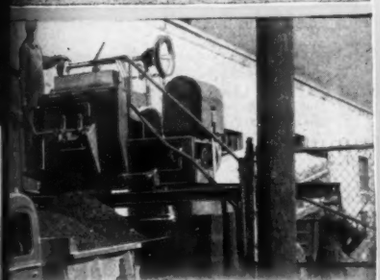
C. & E. M. Photo

A closeup of one of the Joy wagon drills. The man on the right is tamping powder into one of the previously drilled holes.



3½-S DANDIE is sturdy, light, portable for on-the-spot mixing . . . Kwik-Mix line also includes a 3½ cu. ft. non-tilting model.

2-WHEEL 11-S end-discharge, non-tilter, is also available on 4 wheels, side or end discharge for thorough Dandie-mixed concrete.



KWIK-MIX BITUMINOUS mixers . . . 10 and 14 cu. ft., are readily adaptable as stationary plants or as highly mobile 4-wheel units.

FOR DISCHARGE AT 9'-2" HEIGHT . . . Kwik-Mix Tower Loader fits 11-S and 16-S mixers . . . is also available for bituminous mixers. Loads into trucks, forms, overhead hoppers, or handles stockpiling. Collapses for travel.

17-FT.-DEEP Parsons 310 Trenchliner®

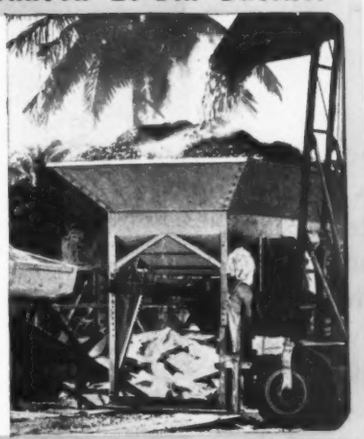
With 45 digging feeds, this big-capacity 310 Trenchliner produces from 8" to 15½' of clean, smooth-walled trench per minute . . . digs 1½ to 4½' wide at 17' depth with single boom, and up to 6' wide at 11' depth with dual booms. 310 has full reverse of all operations for undercutting or making vertical set-ins . . . is equipped with easy-in, easy-out "Tap-In" teeth. Parsons line also includes 4 Trenchliners in smaller sizes.

PARSONS (Koehring Subsidiary)
Newton, Iowa

EASY-CHARGING Johnson Lo-Bin Batcher®

Lo-Bin Trolley Batcher holds 8, 20 or 30 tons . . . is only 7½' to 9½' high for charging with front-end tractor loader. Lo-Bin has 2, 3 or 4 compartments, up to 4 weigh beams, 22 or 44 cu. ft. weigh hopper . . . or can be arranged for 2 or 3 aggregates and 1 bulk cement compartment. Efficiently serves 28-S, 16-S, 11-S, 6-S mixers. Lo-Bin is quickly dismantled, easily moved by dump truck. Optional: wheels, tires, tow-bar.

C. S. JOHNSON (Koehring Subsidiary)
Champaign, Illinois



HIGH-DISCHARGE Koehring 16-E *twinbatch*®

Here's a portable mix plant with controlled elevated discharge for all types of concrete construction. Boom on Koehring 16-E elevates 60°, swings in 160° arc. Bucket discharges controlled batch up to 21' (higher with special boom). 16-E produces up to 50 cu. yds. per hour, exceeding larger 27-E single-drum paver. Drives 6 m.p.h. on rubber tires job to job. Also check big Koehring 34-E *twinbatch* for major paving.

KOEHRING COMPANY
Milwaukee 16, Wis.

X67

Rugged Grading Job Extends State Road

(*Continued from preceding page*)

totaled 275,000 yards.

List & Clark had 9 machines handling about 1,000,000 yards of dirt-moving. There were 4 LaPlant-Choate TS-300 self-propelled units, 4 Wooldridge Terra Cobra scrapers, and one LeTourneau 18 to 24-yard Carryall. The last five were pulled by Cat D8's. Allis-Chalmers HD-20's worked as pushers in the cut. A newly developed ripper made by Malcom Mfg. & Supply Co. opened up the ground for fast scraper loading.

A Blaw-Knox and a LaPlant-Choate sheepsfoot, each pulled by a Cat D6, brought the 6-inch lifts to proper compaction on Marbut's section. No water had to be added. The problem was usually waiting for a few sunny days to dry out the ground. Heavy rains and floodwaters late last summer held the job up for many weeks.

Getting rid of water was the problem in the List & Clark section too. Now and then, though, when the sun was out for a couple of days, the haul roads did get dusty, so the contractor kept a Ford-mounted 1,500-gallon water tank on hand for wetting down. Proper compaction was achieved on fill sections with 4 to 6 passes of the sheepsfoot rollers—a Blaw-Knox with a Cat D7 puller and a McCoy pulled by a Cat D8.

C. & E. M. Photo

A LaPlant-Choate TS-300 with a Cat D8 pusher helps with the grading for List-Clark.

Special Scarifier

Marbut had a shop-made scarifier for subgrade treatment. The rig was designed a few years ago by Gerald Goucher, Superintendent, for work on another project. The base of the unit is 13 feet long, 15 inches wide, and 7 inches deep, and is made up of two 15-inch long channels welded lip to lip with a plate closing the ends of the box. Two arms at the top fit into the outside slots of a three-tooth LeTourneau ripper. There are nine removable Caterpillar motor-grader teeth 18 inches on centers along the front of the base and nine at the back. The rear ones are offset 9 inches, giving the effect of 18 teeth on 9-inch centers. The teeth cut 1 foot below the base of the rig and do a good job of soil processing.

Radio Link With "Outside"

Sole reliance for communications with "the outside world" was placed on List & Clark's mobile radio setup. There were no phone lines anywhere near the grading section, so all calls were relayed by radio to and from a base in Manhattan, Kans. An RCA 150-watt station at Manhattan and one at the field shack handled the job. RCA mobile units mounted in two of the cars maintained contact with the crews on the road.

Both contractors gave their equipment top servicing care. Marbut had a GMC 4 x 6 carrying Lincoln lubricating guns and pumps, a Curtis air compressor, and a Kohler electric plant. List & Clark's Chevrolet service truck carried Alemite lubricating equipment, a small Gardner-Denver compressor, and a Kohler electric plant. Hard-facing and welding work was done on the job with two Lincoln 250-amp welders and a Hobart 400-amp machine at the shop.

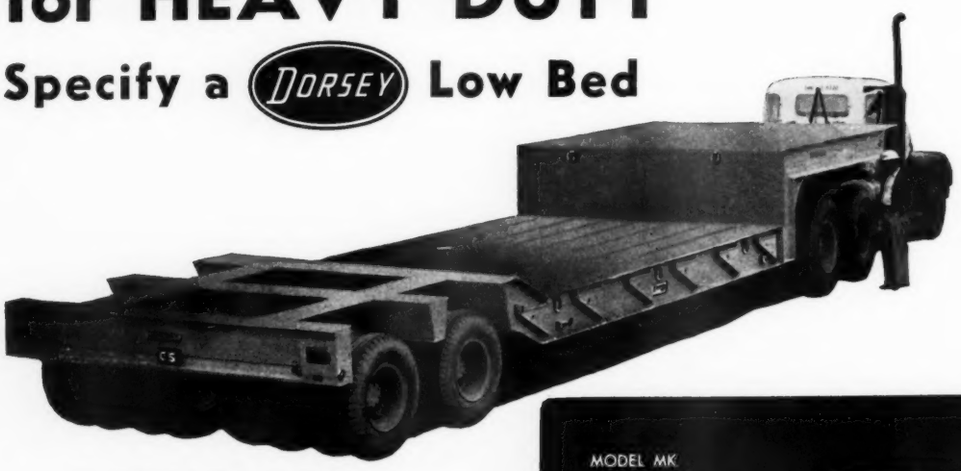
Personnel

Omer F. Brown was Project Superintendent for List & Clark Construction Co. on both contracts. Gerald Goucher supervised the T. F. Marbut construction crews.

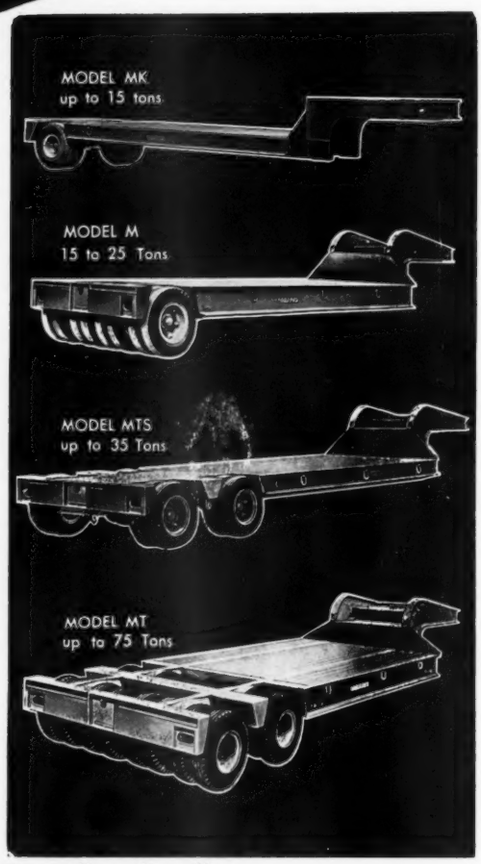
Don J. Christensen represented the State Highway Commission as Resident Engineer. This project lies in Division 2 headed by C. Frank Virr. R. C. Keeling is State Highway Engineer and Gale Moss is Director of Highways for the State of Kansas.

for HEAVY DUTY

Specify a DORSEY Low Bed



Special Dorsey 100-ton drop deck model



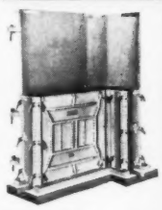
Under heavy loads and over rough terrain the conservative capacity-ratings of Dorsey Low Beds mean extra assurance of dependability. Beam strength, tire capacity, structural members—all are engineered to provide a margin of safety when equipment is subject to unusual strain. This built-in ruggedness accounts, too, for the extra-long life—the extra value—enjoyed around the world by Dorsey owners.

There's a Dorsey for every purpose: semi and full trailers in either level or drop deck models. Also tilt-to-load trailers up to 10 tons.

For address of our nearest distributor, call or wire collect—

DURABLE DEPENDABLE DORSEY TRAILERS
ELBA, ALABAMA

Save manpower time and material



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Asphalt-Testing Unit Counts Scintillation

A scintillation counter has been developed by General Electric Co., Schenectady 5, N. Y., for use in a new asphalt-testing process. The new method is aimed at producing better highways with the aid of atomic radiation.

In the laboratories of The Atlantic Refining Co., Philadelphia, Pa., manufacturer of paving asphalt, typical road stone is soaked in radioactive calcium chloride and dried. It is then coated evenly with asphalt, which may contain additives to improve the adhesive characteristics, and the mixture is covered with water for a specified period of time.

If the asphalt separates from the stones, the radioactive calcium chloride dissolves into the water. After evaporation, the radioactivity of the residue is measured with the G-E scintillation counter. A correlation between the radioactivity count and previously prepared charts tells the Atlantic engineers the quality and adhesive characteristics of the asphalt.

The G-E scintillation counter is designed to detect alpha, beta, gamma, and thermal neutron radiation. This is done by placing various phosphors inside the "chimney" of the equipment. As radiation strikes the phosphor, it excites it so that it gives off a certain amount of "twinkling" (scintillation), the intensity of which varies with the amount of radiation. By counting this scintillation, the instrument accurately measures the radiation intensity.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 879.

New Radio Station For Two-Way System

A new desk-mounting FM transmitter and receiver has been developed by RCA Victor Division, Radio Corp. of America, Point and Cooper Sts., Camden, N. J. Designed for mobile radio systems operating in the 152 to 174-megacycle frequency band, the new Carfone unit is a complete headquarters radio station. It combines a 60-watt transmitter, an adjacent-channel receiver, operating controls, and a power supply.

The Model CSC-60A transmits on three frequencies and receives on two frequencies, making possible multi-channel operation. It can be used to coordinate several different communications systems in a network.

New design features include a compact steel cabinet which accommodates all equipment at one desk position. It is 11 inches high, 22 inches wide, and 20 inches deep, and is said to have ample room for mounting a line termination panel for remote control of the unit. To simplify servicing, all important metering circuits of the transmitter and receiver are connected to two special 11-pin metering sockets. These provide a convenient means for checking the circuits with a standard metering kit or with an RCA Volt-Ohmyst meter. A jack is also provided for measuring the final plate current. The CSC-60A permits use of either a dynamic or a carbon microphone. A positive and negative limiter circuit prevents over-modulation, without the use of any external equipment.

The unit operates on 115 volts, 60 cycles. It uses 135 watts on standby, and 430 watts when transmitting.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 938.

An Electric Pre-Heater

Literature describing an electric pre-heater for diesel and gas engines is offered by Kim Hotstart Mfg. Co., W. 917 Broadway, Spokane 11, Wash. The device plugs into any electrical outlet and a percolator-like action keeps the engine ready for instant starting even when vehicles are stored outside in sub-zero weather.

The booklet points out that the attachment reduces motor wear and depreciation, saves warm-up time, prolongs battery life, and reduces fuel consumption. It shows typical installations and lists specifications for various sizes and types of engines.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 910.

ROAD BUILDERS—IT'S SENSATIONAL
STEEL WIRE BIG PECKERWOOD DRAG BROOMS
IT'S FRAMELESS TRADE MARK REG. NO FRAME REQUIRED
6 INCHES WIDE AND ANY LENGTH TO 12 FEET
NAME YOUR LENGTH — ASSEMBLE YOUR OWN
IN ANY SHAPE WANTED — IN MINUTES — NOT HOURS
MADE WITH KILN DRIED 6" WIDE HARDWOOD AND HEAVY GAUGE SPRING STEEL WIRES TRIPLE WIRES OUT EACH HOLE.
ILLUSTRATION OF 12-FOOT SECTION
ONLY $3.50 RUNNING FOOT
THE TOUGHEST WIRE DRAG BROOMS EVER BUILT
LITTLE PECKERWOOD
STANDARD UNIT SIZE
MADE TO FIT YOUR FRAME
3" Wide, 15" Length
with 2 Bolts.
Double Wires Out Each Hole.
OUR DRAGS NOT STAPLE SET. BOTH STOCK ITEMS.
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PRICES F.O.B. K.C., MO.
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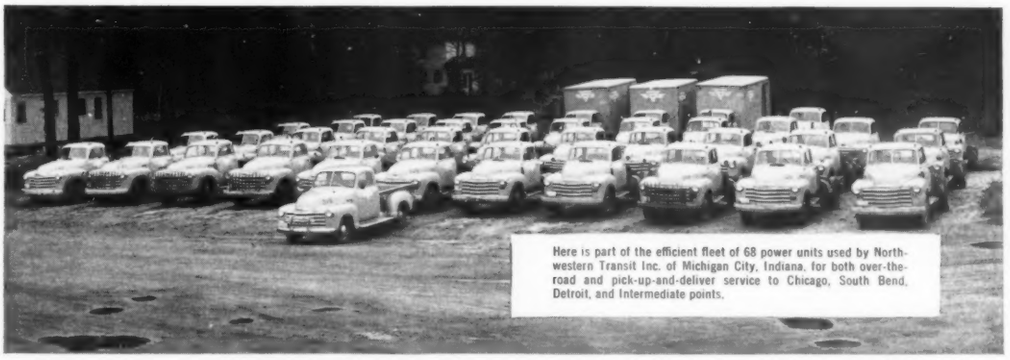
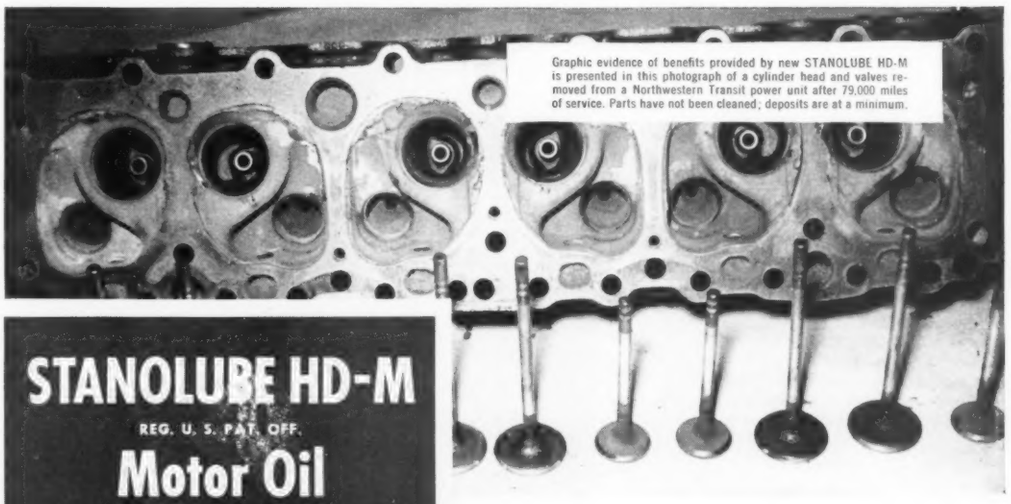
327 S.W. BLVD. KANSAS CITY, MO.
SINCE 1928



Here is part of the efficient fleet of 68 power units used by Northwestern Transit Inc. of Michigan City, Indiana, for both over-the-road and pick-up-and-deliver service to Chicago, South Bend, Detroit, and Intermediate points.

Now, over 80,000 miles between overhauls



Graphic evidence of benefits provided by new STANOLUBE HD-M is presented in this photograph of a cylinder head and valves removed from a Northwestern Transit power unit after 79,000 miles of service. Parts have not been cleaned; deposits are at a minimum.

STANOLUBE HD-M
REG. U. S. PAT. OFF.
Motor Oil

● An aggressive policy of stopping trouble before it develops into a serious problem has well rewarded Northwestern Transit Inc., of Michigan City, Indiana.

Six years ago, officials of this fleet discussed lubrication troubles with a Standard Automotive Engineer. As a result, they switched their entire fleet to STANOLUBE HD, Standard's original heavy-duty motor oil. Bearing troubles and ring sticking previously experienced with a conventional lubricant were eliminated. Valve life was extended.

When Standard's new and better STANOLUBE HD-M Motor Oil was introduced recently, Northwestern Transit readily adopted it for use. In the face of increasingly severe service, STANOLUBE HD-M through its better detergent-dispersant action has provided greater engine cleanliness and has further extended valve life. The 68 units in this fleet now average from 80,000 to 100,000 miles between valve jobs. Operating costs, not including depreciation or tires, have been reduced to the impressive low average of six cents per mile.

The experience of Northwestern Transit indicates the benefits you can obtain by using new and better STANOLUBE HD-M Motor Oil. A Standard Oil Automotive Engineer will be glad to help you. Phone your local Standard Oil (Indiana) office. Or write: Standard Oil Company, 910 South Michigan Ave., Chicago 80, Ill.

STANDARD OIL COMPANY STANDARD (Indiana)

Fine-Grain Aggregate Makes Concrete Fluid

A radically new construction material—tiny glass balloons about the size of grains of sand—may possibly mean goodbye to hand shoveling in the building industry. Developed by Armour Research Foundation of the Illinois Institute of Technology, Chicago, Ill., and sponsored by Kanium Corp., Chicago, Kanamite is a fine-grain lightweight aggregate made by blowing up individual grains of clay in a special furnace.

The material is made in mid-air, inside a furnace. Ground and screened clay is fed into the top of a tall vertical furnace and the individual grains melted in the 2,700-degree F heat of a gas-air flame as they fall through it. At the correct instant, gases given off by the tiny melted blobs inflate them into hollow spheres. The balloons drop out of the flame and cool during the remainder of their fall. They are collected at the bottom of the furnace.

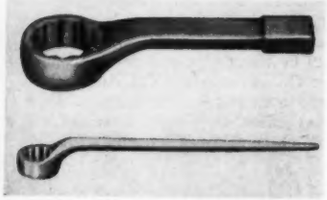
Kanamite, originally conceived by J. D. McLaughlin, now President of Kanium Corp., has many potential applications. Concrete mixes using the material in place of sand or other aggregates are very fluid, despite the low-water content. This means that contractors can fill forms with concrete pumped through rubber hoses, thus virtually eliminating the use of shovels. Also, concrete, mortar, and plaster made with the material are strong and light with good insulating qualities, the Foundation explains. The inherent strength of the material has been demonstrated by making plaster specimens with it that show a compressive strength greater than that of specimens made with sand. The high strength of this plaster will allow thinner coatings of it to be used on walls. In addition, being strong as well as light, the thin layer of plaster is able to support its own weight. Plaster board, too, can be made thinner and lighter without losing strength.

According to John Neff, Assistant Chairman of the Ceramics. and Minerals Research Department at the Foundation, Kanamite is not to be confused with the bloated or expanded aggregates now so widely used in concrete-construction work. Particle size alone completely divorces lightweight concrete aggregates, which range upward from a diameter of perhaps 3/16 inch, from Kanamite particles, which range downward from this level to as small as .0024 inch in diameter or even smaller.

A semiproduction plant, completed this year in Blue Island, Ill., is now producing the aggregate and serving as an extension of the Foundation's laboratories for continued improvement of the process.

Redesigned Wrenches

Two types of heavy-duty wrenches—long-slugging-box and spud-end-box—have been redesigned by the Plomb Tool Co., 2209 Santa Fe Ave., Los Angeles 54, Calif.



The company reports that fifteen long-type slugging wrenches with 12-point box opening—Nos. USN326-356—have three improvements. The former straight handle has a built-up striking face which is said to give a large area to receive blows, prolong handle life, and improve balance. The points of greatest strain, where the shank joins the box end, are strengthened to increase tool life and safety. The shank is streamlined for a comfortable grip and to improve appearance.

Sixteen spud-end wrenches with 12-point box opening—Nos. 2613-2647—were lengthened (by 3 to 4½ inches in six cases) to secure greater leverage. With the new designs, tool weight and strength are said to be in better balance with opening sizes, the wrenches have a more uniform progression of length as opening sizes increase, and the longer tapered handles simplify the job of aligning holes in flanges, the company claims. Head thicknesses were increased on four wrenches to give a better grip and more strength.

Further information may be secured from the company. Or use the Request Card that is bound in at page 18. Circle No. 861.

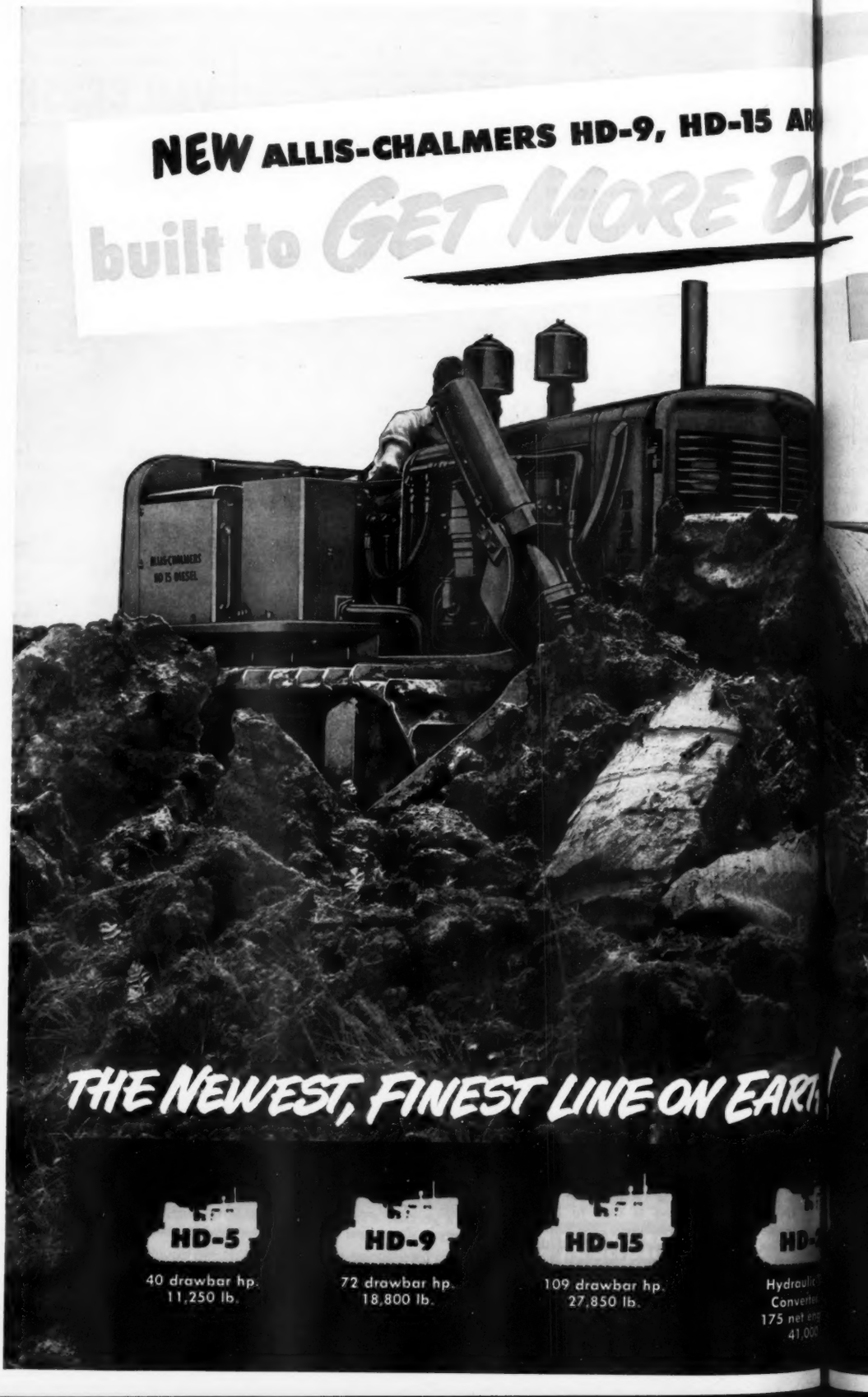
Catalog on ¾-Yard Shovel

A 24-page bulletin on its ¾-yard shovel has been released by Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis. It points out that the Model 255-A easily converts to shovel, dragline, crane, clamshell, trench hoe, pile driver, and magnet crane. It includes action shots of these machines at work, plus two pages of plant scenes showing actual manufacturing operations. The booklet also illustrates design features and the various components of the shovel.

This literature may be obtained from the company by requesting Bulletin X71-4, or by using the Request Card at page 18. Circle No. 944.

Goodrich Promotes Bules

Richard T. Bules has been named Manager of V-belt Sales, Industrial Products Sales Department, B. F. Goodrich Co., Akron, Ohio. He has been with the company in various capacities for the past 12 years.



Diabetes Week: Nov. 16-22

Diabetes may be whittling away at the efficiency and productivity of your employees, according to Frank N. Allen, President of the American Diabetes Association. The high incidence of the disease is reason enough for alertness on the part of every employer. One American in 75 has diabetes—no one is immune to its threat.

Though diabetes is the eighth cause of death by disease in the United States, it is the only chronic illness for which there is a known control. Victims not only can be restored to a normal and productive life, but also can usually keep their regular jobs. Relative to promptness of its discovery, the control of the disease is easy.

Detection is even simpler. For this reason, the American Diabetes Association, Inc., has named November 16-22 "Diabetes Week", during which time an intensive nation-wide drive will be conducted to find an estimated 1,000,000 undetected cases of the disease. Through its affiliates and local medical societies' diabetes committees, every executive and community leader will be asked to help. The Association has also prepared a special article telling the layman why Diabetes Week is important and explaining the detection and control of the disease. Copies may be obtained by writing to the Association at 11 W. 42nd St., New York 36, N. Y.

Detection of diabetes is not only a civic responsibility—it's a sound business policy. Won't you help?

U. S. Steel Promotes Plumb

R. Kenneth Plumb has been appointed Manager of Slag Sales for United States Steel Co., Pittsburgh, Pa. He succeeds Erle L. Flad, who retired last month after 43 years of service with the company. Mr. Plumb was formerly in the company's American Steel & Wire Division.

"Jones is in constant fear of a cave-in."

built to TAKE IT LONGER

Unequalled Lugability

The HD-9 and HD-15 build up greater drawbar pull faster . . . hold it longer than ever thought possible in gear transmission tractors.

For example, when tough going has pulled travel speed down 40 percent, these tractors will have increased their drawbar pull almost 20 percent over rated pull. They will lug down almost 45 percent from rated travel speed before drawbar pull even starts to fall off.

To take full advantage of this important GM 2-cycle diesel engine characteristic, the HD-9 and HD-15 have longer truck frames, lower idlers and sprockets. That means more track on the ground . . . better stability . . . sure-footed traction . . . unequalled *lugability*.

Extra Long Life

Here are a few of the many reasons why these newest, finest tractors are *built to take it*.

- All-Steel Welded Construction
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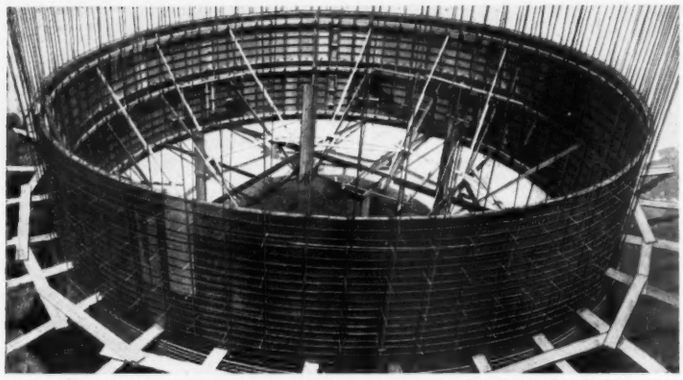
TRACTOR DIVISION · MILWAUKEE 1, U. S. A.



Setting Up Forms for Sewage Disposal Tank, St. Louis County, G. L. Tarlton Co., G. C.

Symons Forms for Curved Walls

Symons Rib panels are used with V-shaped fillers at each joint. Wedge-bolts secure the 3 pieces together and also hold the ties in place. Curved walers or 1"x6" flat walers may be used for alignment.

Contractors report savings of $5,000.00 on forming costs of Sewage Disposal Plants.

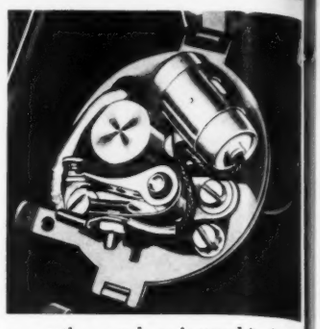
Symons offers a complete engineering service. Send plans for your next job and get complete layout and cost sheet — no obligation. *Symons Clamp & Mfg. Co., 4251-G2 Diversey, Chicago 39.*

New Ignition System

A new ignition system, which is said to reduce servicing time as much as 95 per cent, in addition to prolonging the life of spark plug and points, is available for Continental Motors air-cooled industrial engines.

In the Contex system, the breaker points and condenser, instead of being housed within the flywheel as in conventional air-cooled engines, are mounted as an external unit on top of the crankcase. The cam which actuates the points is driven off the camshaft. The company claims that this does away with the need for removing the shroud and flywheel when these parts require inspection, adjustment, or repair, because they are instantly accessible under a quickly removable cap held in position by spring clips.

It is also said to lengthen the useful life of these ignition system components, because the breaker points operate at one-half engine speed. Instead of wasting every other "break" and



every other spark, as is usual in 4-cycle air-cooled engines, it makes use of every spark.

On Continental air-cooled models of the AU series, this system is available also in conjunction with a mechanical governor of the fly-weight type, the centrifugal unit being housed under the same cap as the condenser and points.

Further information may be secured from Continental Motors Corp., Air-Cooled Engine Div., 12800 Kercheval Ave., Detroit 14, Mich. Or use the Request Card that is bound in at page 18. Circle No. 863.

Earth-Moving Symposium

An estimated 200 Army, Air Force, Navy, and Marine Corps engineers, and manufacturers, will participate in a symposium next month on the development of earth-moving equipment for military use. The symposium is to be held at the U. S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif., on December 10 and 11. Defense Department engineers will pool experience and data already gained with the research of manufacturers in an effort to speed up military earth-moving operations.

The joint discussions and technical papers will be aimed at furthering machinery developments to increase operating efficiency and effect economies, and will emphasize the need for new equipment which will meet peculiar problems and logistical requirements. The development of more effective standard equipment will also be considered. Discussions will include: reduced maintenance costs, simplification of operation and controls, multi-purpose equipment, and special requirements such as reduction in weight, cubage, and cost.

The program calls for review of special military requirements and such equipment as wheels and tracks, torque converters, automatic transmissions, electric drivers, and power-plant advances, including gas turbines, vapor phase cooling, and superchargers.

An Arc-Welding Movie

"No Finer Electrodes Made . . . Anywhere", a new 22-minute color motion picture showing the inside story of how arc-welding electrodes are manufactured, had its first showing in October at the National Metal Exposition in Philadelphia, Pa. Alloy Rods Co., York, Pa., made the film and used it as the central feature of its exhibit. Officials of the firm said that the movie was purposely photographed and edited as an instructional and technical picture story to be shown before organizations interested in arch-welding techniques.

The picture proceeds from the initial step—cold drawing of hot-rolled rod—on through the many manufacturing, research, and quality-control processes to the company's method of packing finished electrodes in sealed all-metal moisture-proof containers.

Sixteen-millimeter prints of the movie and a 24-page brochure showing key "stills" for distribution, are available to any organization or group which desires to show the film. Those interested should write to Department M, Alloy Rods Co., York, Pa.

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The long flat muscles of the black panther give him the spring and suppleness he needs to survive in his particular environment. They're ideal for the job they're called upon to perform.

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New Concrete Street Gives Access to City

Texas State Highway Department Pushes Divided Highway Job to Connect City of Waco With U. S. 81

• "SOMEBODY has to do this kind of job."

So said J. T. Maness, Project Superintendent for Worth Construction Co. of Fort Worth, Texas, one hot August day, as he looked down the line of paving equipment and men on the new by-pass street near U. S. 81 in Waco, Texas. What Maness meant was plain to see. His job was one of those short but important sections of highway paving within a city, where numerous crossings and transitions were slowing him down.

With the cooperation of the Texas Highway Department, which engineered and financed the 4,800-foot project, Waco has done a job this year which has been needed for some time. The space formerly occupied by a small city street has been taken, along with housing space nearby, to build a divided highway from the city proper out to U. S. 81, the principal north-south highway through Waco. The new street is a four-lane highway with an additional 13 feet 5 inches on each side for parallel parking and clearance. It would be an expressway if it were free of street intersections, and it is expected to do much toward relieving traffic congestion from the city center to the north. Future work later will extend this job.

Design

The new pavement consists of a 9-inch reinforced-concrete slab, set on both sides of a 6-foot dividing island with raised curbs. At the street intersections, joined crossover pavement connects the two roadways. Each roadway is 37 feet 10½ inches wide, curb to curb. The pavement is set on a natural, hard, sandy-clay subgrade, some of the best in central Texas. No cushion or granular-base material is necessary.

The slab is reinforced at its midpoint with a mat of ⅝-inch and ½-inch reinforcing bars, placed in an 18-inch grid pattern. Expansion and contraction is taken care of by means of redwood expansion joints every 60 feet, with Star Lugs set across the slab at 12-inch intervals. The top of redwood is set about 1 inch below the pavement level, and the crack filled with asphaltic-rubber joint material.

To build each lane as planned, it was necessary to place a 24-foot strip and a lane measuring 13 feet 10½ inches wide. These two lanes were joined by a construction key, and ⅝-inch dowel bars. The dowel bars came in two sections. One section with a nut was placed on the first pour, and the other half of the pavement was placed after the remaining part of the dowel had been screwed into the nut.

The concrete was a standard port-

(*Continued on next page*)

Ray Day Photo

On the Waco, Texas, by-pass job, a Koehring 34-E Twinbatch paver dumps a 1½-yard batch of fresh concrete on the subgrade ahead of a Jaeger-Lakewood spreader. Worth Construction Co. was the contractor.

HERE YOU SEE a model 105 Schramm portable engine driven air compressor furnishing air to drive rivet guns on an overpass on the famous Gulf Freeway extending from downtown Houston to Galveston, Texas. Contractor on the job: Haynes Erection Company, Houston.

Schramm portable air compressors range in sizes to fit your particular air needs, and offer fuel savings up to 50% . . . simplified design . . . safety features . . . and many "extras."

For full details write today for Bulletin SPB-51.

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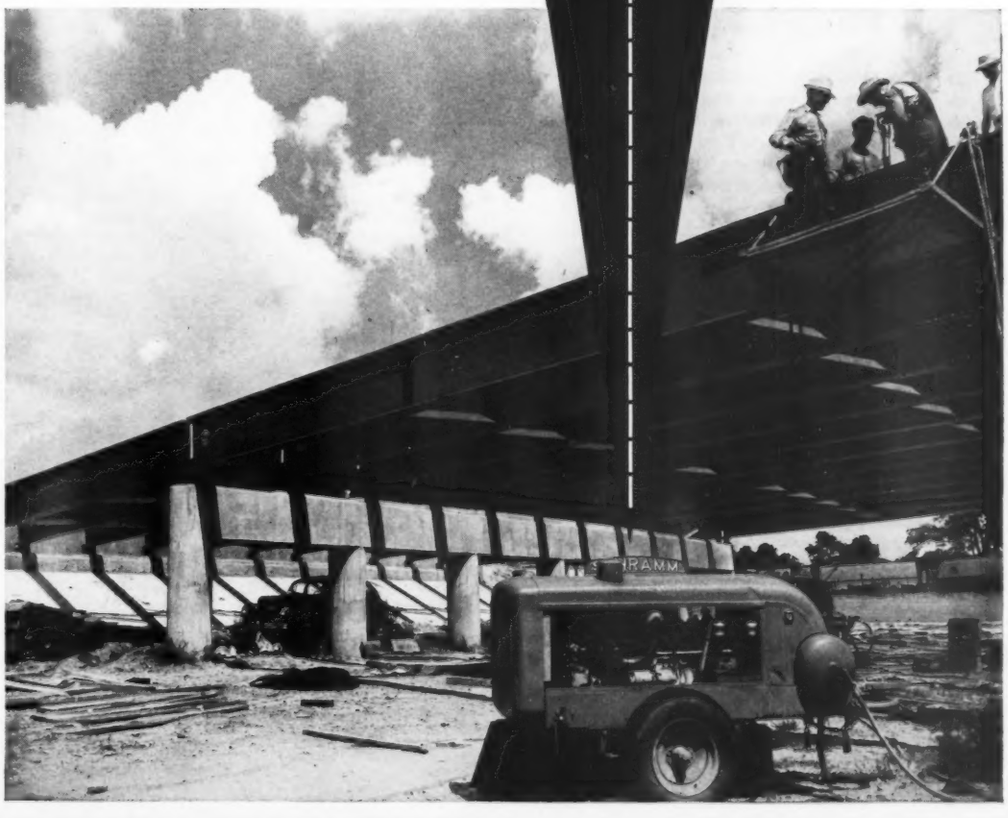

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New Concrete Street Gives Access to City

(Continued from preceding page)

land-cement mix, consisting of 5 sacks per cubic yard, without any admixtures or air entrainment. Flexural break tests ran between 700 and 750 pounds.

Grade Preparation

Preparation of a grade was relatively easy, because the terrain was already reasonably level, and other agencies had moved what houses had to come out of the way. Three Super C Tournapulls, brought in on a subcontract basis, moved the dirt around and quickly shaped the grade. Excellent compaction was secured by sheepsfoot and pneumatic rollers, as well as by the rubber tires of loaded equipment, and the finished grade was so hard that surveyors often had to drive pilot holes with a steel peg to set survey marks for line and grade.

The final grade was made by a Caterpillar No. 12 motor grader, which tight bladed the material down to very close tolerance. Excess material pulled up by this operation was either drifted ahead, or, if there was too much, it was loaded out by a small HD-5 Allis-Chalmers Tracto-Shovel, and hauled ahead by dump trucks. A stockpile of material, which will be used in future work, was made near the junction of the new work and U. S. 81.

Ray Day Photo

Men fill curb forms in the foreground as paving work continues in the background.

Some 2,000 road-feet of 9-inch Blaw-Knox steel forms were on the job. These were set by conventional methods, except that about 15 men were necessary in the form-setting gang to make the numerous street turnouts and transitions. A string line, set to line and grade established by survey instruments, governed the position of the form line. Little or no form tamping was necessary, because the subgrade was already close when the motor grader finished, and a Cleveland Formgrader also made a light pass along the string line prior to the setting of the sections.

Any inequality in the subgrade usually consisted of low places. To fill these, a drag blade was used behind an Allis-Chalmers HD-10 tractor, and a light roller followed up to smooth the ground. Light sand was used ahead of the drag blade.

The intersections and transitions at the turnouts were formed either by sections of steel forms, or by wood. However, the steel sections usually served to outline the flared edge of the concrete at these places.

Big Paver Used

The paver which placed the concrete was a Koehring 34-E Twinbatch machine, with a standard 35-foot boom, capable of mixing a 1½-yard batch adequately. The job was started at the south end, pouring the first 24-foot lane east of the dividing island. The machine then turned around and poured the opposite 24-foot lane. By this time the first lane had its required 14-day age, so the paver was able to travel on the slab while it placed the first 13-foot 10½-inch lane. A final narrow lane completed the work. Completion of the paving was achieved about 30 days after its July 21 starting date, despite the transitions and street intersections which made big labor crews necessary.

Fortunately for the paving crew, the entire route was blocked off to traffic during construction, and only such traffic as batch trucks, company pickups and so on was allowed. The batch trucks delivered their 2 and 3-batch loads to the paver skip usually by turning around either loaded or empty, depending on which way the paver was headed. Mixing water was trucked from the Brazos River, where it was loaded by a Rex pump and a standpipe. A 1,000-gallon trailer attached to the Koehring paver kept that machine supplied.

NEW Cedarapids Built by IOWA Schrock Motorized HEAD PULLEYS

SIMPLIFY EVERY BELT CONVEYOR AND BELT-BUCKET ELEVATOR INSTALLATION

IT'S COMPLETELY DIFFERENT FROM CONVENTIONAL CONVEYOR DRIVES

Everything is contained INSIDE the pulley!

ELIMINATES ALL MAINTENANCE ON SPROCKETS, CHAINS, JACK-SHAFTS, V-BELTS, ETC.

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WHAT A *Motorized* HEAD PULLEY IS

THIS is a revolutionary departure from the conventional types of conveyor drives. A *motorized* head pulley is a fabricated steel pulley with *everything*... electric motor, reduction gears and all moving parts . . . contained inside the drum! It's simply a new application of the long-proven gear reduction drive, and because of its simplicity, it's the answer to the maintenance man's prayer. 70% to 90% of conveyor down time is saved by eliminating all countershafts, speed reducers, sprockets, chains, Universal shaft drive and other parts necessary with conventional pulley drives. Motorized Head Pulleys are simple to install and flexible in use, completely interchangeable and adaptable to all types of belt and belt-bucket conveyor installations. By means of a simple adapter, a single pulley can be utilized in any of several belt locations, operating various widths of belt, or changing from larger or smaller horsepower. Pulley sizes range from 5 to 30 HP and are available in various widths. A Motorized Head Pulley is safe, because there are no sprockets, chains, jack-shafts, V-belts, etc. to endanger personnel. It's compact...requires no more room than a conventional pulley. Complete protection from weather, grit and dirt also reduces maintenance. Cedarapids Schrock Motorized Head Pulleys have been job-tested for many years under severest working conditions.

HOW IT WORKS

The pulley shell rotates about the electric motor, which is held stationary by means of a torque arm attached to the conveyor frame. The speed of the shell depends upon the combined reduction ratio of the various pinions and gears contained within the pulley shell. This reduction starts with a primary pinion mounted on the motor shaft and ends in the ring gear attached to the shell. The shell in turn then drives the conveyor belt. Leads to the motor enter the head pulley through a hollow conduit passing through the drum end bell and bearing. A simple oil bath gear compartment provides a lubricating bath for the reduction gears and front motor bearing. Motor and head pulley are cooled and ventilated by holes in the drum.

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Find out all the advantages of converting your conveyor installations to motorized efficiency before you need head pulley replacements. One internationally known company has 50 Motorized Head Pulleys installed on widespread conveyor operations, and plans more for every installation that requires replacement. Get complete details about every feature. See your distributor today, or write direct to Iowa Manufacturing Company.

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For the first lane, the paver worked along on the subgrade of one of the adjoining strips, and this was true, too, of the next 24-foot strip. The narrower lanes were both poured from the previously built slabs, however, and any possible damage by the tracks of the paver was prevented by slipping 6 old rubber tires under each track as the machine crawled along.

Two sets of spreading equipment were necessary. For the 24-foot slabs, a Jaeger-Lakewood spreader and a Koehring longitudinal float finisher comprised the lineup. On the narrower slabs, a Jaeger-Lakewood spreader was used, and finishing behind that machine was done by hand.

The concrete was placed in all lanes in a single pass, and no reversal of direction was needed to cover the reinforcing steel. The steel was tied on the subgrade, and as the concrete was dumped down the line, small steel chairs made of angle iron were inserted just ahead of the operation. When the concrete had been dumped, two men kept the chairs moving ahead with the aid of steel handles on these devices, and the concrete took up its job of supporting the reinforcing bars from that time on.

Both form edges were vibrated by Mall external-type machines, at the time the spreader passed by.

Curb construction was monolithic with the main slab. Several sets of steel curb forms were on hand. These were set on top of the main form and finished slab immediately after pouring, and a length of longitudinal steel reinforcing bar was inserted to strengthen the curb. From time to time the paver operator dumped a batch of fresh concrete outside the form lines. This material was shoveled by hand labor into wheelbarrows, and wheeled back to fill the forms.

Considerable hand finishing marked the project, and a sizable gang of workmen had to be present to get it done. Long-handled bullfloats, steel straightedges, edging tools, and a final belt finish on the main slab were all used. The street intersections were often graded up to the various street elevations by the finishers as they worked across from the form lines. Concrete was cured for a week by paper rolls, which protected the green masonry from the terrific summer heat thus giving it a chance to gain strength.

In some cases the forms did not have to be moved ahead for re-use. The pins were pulled by a small puller, and the sections were simply carried across the slab to make the side form for the next one. Before each pour, the forms were cleaned with a shovel and oiled lightly with diesel fuel.

Batching Facilities

Because the project was in the city limits of Waco, it was not far from a main railroad line. A batching plant was erected on a spur line about 5/8 mile from the south end of the job, and all dry-batched concrete materials were delivered from that point by Ford, Chevrolet, and International batch trucks, hauling two or three 1½-yard batches depending on the truck size.

Ray Day Photo

A Lorain crane with a 1½-yard clamshell moves aggregate ahead as an International batch truck picks up a load at the Blaw-Knox batch plant.

The plant consisted of two units: a Blaw-Knox manual aggregate and sand plant, and a new Heltzel bulk-cement batcher. The Blaw-Knox plant handled two sizes of aggregates and sand, with the help of a 1½-yard Lorain clam, which unloaded the material from railroad cars and kept the plant bins charged. A haul road was arranged so that batch trucks could drive through under the bins without any loss of time backing in. A drive-through system was also arranged under the Heltzel plant.

Aggregates and sand were shipped in from a nearby commercial supplier, and Atlas bulk cement from hopper-bottom cars was also used. The 1½-yard batch used a basic weight of 3,080 pounds of 1½-inch-minus gravel; 2,043 pounds of sand; and 710 pounds of cement.

Because of the peculiar job conditions, about the highest day's run was 825 cubic yards of concrete. Worth Construction Co. at about the same time had a big 140,000-square-yard paving job of 14-inch concrete at the Consolidated Vultee aircraft plant in Fort Worth, which normally might have been expected to be the more spectac-

(Concluded on next page)

These heavy-duty Diesel-driven PORTABLE AIR COMPRESSORS deliver 1200 cfm. Whenever air demand falls off, however, the CP Gradual Speed Regulator reduces engine speed proportionately, yielding greater economy and minimizing wear. CP Diesel and gasoline portable compressors range from 60 cfm to 600 cfm.

CP PORTABLE SLUDGE PUMP handles up to 15% of solids. Pumps grout, or hydraulically transports sand or muck. Handles water containing sand or rock without causing rapid wear of expensive replacement parts. No priming necessary. Operates on 105 cfm compressor.

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Rugged tubular chassis and drill carriage of the G-300 WAGON DRILL provide rigidity and strength without undue weight. The tubular "H" structure, that supports the drill carriage, affords great flexibility, stability, and minimizes vibrations. Designed to take full advantage of the high drilling speed and strong rotation of the CP 4-inch 70-N Drifter, the all-around sturdy construction of the G-300 maintains correct alignment under most difficult conditions.

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New Concrete Street Gives Access to City

(Continued from preceding page)

ular of the two. "Maness had a tougher job than we did", said officials of the Convair-plant project.

Thanks to the work of many men and much paving equipment, Waco's traffic problem is now somewhat eased. In time, even this work will be enlarged upon in order to continue the fight against traffic congestion in that area.

Personnel

Field operations for Worth Construction Co. were directed by Project Superintendent J. T. Maness. The project was under the design and general supervision of the Texas Highway Department, which is headed by State Highway Engineer D. C. Greer. Jed N. Robinson is Construction Engineer, and D. M. Puckett is District Engineer, with headquarters at Waco.

Radial-Arm Machine Has Power Cross Feed

A radial-arm cutting machine featuring both flexibility and power cross feed is announced by DeWalt Inc., P. O. Box 540, Lancaster, Pa. The Model GE can cut materials up to 2 x 18 inches without any adjustments in the air-feed mechanism. The company points out that it is necessary only to press the foot-control valve, hold until the desired cut has been made, and then release. The two-way action of the air cylinder immediately returns the saw to the idle location. The air-feed cylinder is said to be quickly detached by removing a stud. Besides the normal straight cutoff, the Model GE can also make miter cuts, bevel cuts, and compound miter cuts.

DeWalt also announces a new addition for its Model GRR radial-arm saw. The 5-hp three-phase unit has a 16-inch blade for making 5½-inch cuts.

Further information may be secured

from the company. Or use the Request Card at page 18. Circle No. 940 for information on the Model GE and No. 915 for the Model GRR.

Help insure America's security and your own. Buy U. S. Defense Bonds.

Driverless Trucks Oust a Human Error

Driving around and around an oval track is a monotonous business, and test drivers who have to do it tend to deviate from the exact course, thus diminishing the accuracy of the test in progress. According to "The Central Constructor," official publication of the Associated General Contractors of Iowa, that state is eliminating this element of human error. Iowa is constructing a track at Ames over which the testing vehicles will operate automatically—without drivers.

In general, the half-mile track will be in the form of a 12-foot-wide concrete trough, with various cross sections to accommodate different kinds of tests on pavements, bases, and subgrades. It will be 1,100 feet x 350 feet, with the sharpest curvature in a 112-degree segment of 250-foot radius at each end of the oval; curves will be connected by 300-foot tangents. Twelve inches of superelevation on the curves will allow an average speed by test vehicles of 30 miles per hour. This will permit about 1,400 passes per truck per 24-hour day.

Control of the driverless trucks (standard highway vehicles) will be by steering-gear outriggers contacting a continuous guide rail running along the top of the trough walls. Devices clamped at suitable places on the rail will trip control levers that will change the speed of the trucks or stop them. The trucks will be started manually by means of an outside clutch lever. Included in the plans is a test-instrument house where, later, atomic science will come into road testing through the use of radioactive isotopes. Till then, there will be recording oscillographs to handle load-pressure cells, load distribution and deflection equipment, and flow meters, pumps, and controls for subsurface moisture or drainage.

The Iowa Highway Research Board is sponsor of the track, which will be handled by the Iowa Engineering Experiment Station. Professor Ladis H. Csanyi of the Civil Engineering Department, Iowa State College, is in charge.

It is estimated that the Ames project will cost about $269,000, with a first-stage cost of $144,000. The instrument house would add some $75,000 to the cost. The state, however, will save on drivers' pay!

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Motorola 2-Way Radio

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In any hard-slugging operation that requires fast, accurate timing of all crews and equipment, look to Motorola 2-way radio as step one in promoting efficiency, economy, and new operational profit!

As an investment, too, Motorola puts first emphasis on your *profit interests*. The equipment is Motorola-engineered throughout to give you the biggest dollar's worth of top performance. It also gives you the protected value of obsolescence-proof equipment that will stay up to date for years to come.

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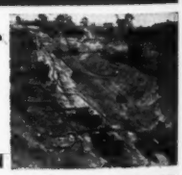

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Types, Application Of Steel Scaffolding

New Scaffolds Offer More Safety, Speed Construction, Lower Costs, And Improve Appearance

• HERE are some basic facts on the types and uses of modern steel scaffolding. Most steel-scaffolding equipment can be either purchased or rented. Usually purchase is to the contractor's advantage only if a steady volume of work keeps his scaffolds busy. Many construction firms buy a basic quantity of scaffolding and rent more when needed. Also, many scaffolding suppliers offer complete services including layout, erection, inspection on the job, dismantling, and reconditioning.

In general, steel scaffolds for the construction industry fall into three main classifications: built-up scaffolds; hanging scaffolds; and rolling scaffolds.

Built-up Scaffolds

Built-up scaffolds are of two types: sectional-frame and tube-and-coupler.

Sectional-frame scaffolding—Trouble-Saver is an example—is erected from prefabricated welded tubular-steel frames of various designs and heights. Width is usually 5 feet. The frames are placed one on top of another and are connected by diagonal cross braces of various lengths to give the desired spacing between the frames. Sectional-frame scaffolds are commonly used for bricklaying, stone setting, steeple and tower work, for refacing, plastering and electrical installations. They are also useful on concrete-pouring operations where they can support the forms or make a concrete wheeling scaffold.

To get all the safety provided for in sectional scaffolds, follow these recommendations: (1) Observe the manufacturer's instructions regarding the maximum load. (2) Use 2-inch scaffold-grade lumber, or heavier, for platforms. (3) Tie the scaffold into the building every 20 feet of height and 25 feet of length. (4) Install guardrails and toe boards. (5) Use suitable overhead protection against falling objects. (6) While the scaffold is in use, do not allow any structural part to be removed without permission from the proper authorities. (7) Use enough bracing to insure stability. (8) Inspect the scaffold when it is erected and periodically during use.

Tube-and-coupler scaffolding—Tubelox is an example of this—has been used on nearly every type of building and for almost all construction trades. It is most versatile because working levels can be established at desired heights by means of couplers. Curved surfaces, extreme heights, uneven ground, and building setbacks are no problem with this type of equipment. Tube-and-coupler scaffolding is erected from only four basic parts: galvanized-steel tubes of various lengths joined by fittings locking to form a continuous tube: standard right-angle couplers for right-angle joints; adjustable couplers for joints at other than right angles; and bases on which the scaffold is erected. The tubes are usually 2 or 2½ inches in diameter and from 6 to 13 feet long.

All the safety precautions for sectional scaffolds should be followed when using the tube-and-coupler type. Also, check the scaffold after erection to be sure that match marks on the members indicate that joints between connecting tubes are locked.

Hanging Scaffolds

Hanging scaffolds, such as those manufactured by the Patent Scaffolding Co., also fall into two types: heavy-duty suspended scaffolds, and swinging scaffolds.

Heavy-duty suspended scaffolds use steel rope wound on a ratchet-drum mechanism, as a raising and lowering device. The scaffolds are generally suspended from steel or aluminum outrigger I-beams, with each beam supporting two of the hoist mechanisms. Pairs of drums and their connecting putlogs are spaced not more than 9 feet apart lengthwise, to accommodate 12-foot planks which give the platform a solid deck. Standard platform width is 5 feet.

Suspended scaffolds are widely used for bricklaying on steel or concrete frame buildings. With the outriggers mounted on wheels, they have proved handy for cornice-removal work. Ceiling-suspended scaffolds show another use for this equipment. When erecting suspended scaffolds, remember these safety precautions: (1) When work is in progress above, install overhead at-

(Concluded on next page)

Contractor A. R. Warner & Son used the built-up type of steel scaffolding during construction on the Presbyterian Church, Waynesboro, Pa. Gold Medal Tubelox has wire screening as a safeguard against falling objects.

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Types Application Of Steel Scaffolding

(Continued from preceding page)

tachments for protection against falling objects. (2) Inspect the scaffolding, drum mechanisms, and wire rope periodically. (3) Use guardrail and keep it in good condition. (4) Install toe boards to prevent objects falling from the scaffold. (5) Where I-beams are rigged over the parapet wall, make sure that it will carry the load of the outrigger and scaffold, or that suitable bench or blocking is installed. (6) Do not overload the scaffold. (7) Overlap planks at least 1 foot on each side of the putlog. (8) Make sure that the wire ropes are always hung perpendicularly.

Swinging scaffolds for light-duty service also employ steel-wire rope and a mechanical raising and lowering device. They are fitted with one cable-and-hoist mechanism at each end of a prefabricated stage that is generally 16 to 22 feet long and from 20 to 28 inches wide. Swinging scaffolds are used for stone setting, glazing, pointing up or washing down masonry, and erecting or stripping forms. Here, again, alert contractors have found these scaffolds useful for other types of work. Bridge painting and repairs and stand-pipe work are examples.

The hanging type of scaffolding was chosen by Branna Construction Co. for masonry work on an addition to the Jewish Home for the Aged, Pittsburgh, Pa. Gold Medal Safety scaffolding machines support the scaffold.

For safety when using swinging scaffolds: (1) Test the platform before using by supporting it 18 inches from each end and having two men stand on the middle. (2) Inspect the raising and lowering mechanism frequently. (3) Remember that this is a light-duty scaffold for men with hand tools and minimum materials, so don't overload it. (4) Be sure there are at least three turns of wire rope on the drums at all times. Do not lower the scaffold below this point. (5) Equip the stage with toe boards and guardrail, properly supported at both ends and in the center.

Rolling Scaffolds

Rolling scaffolds can be erected from sectional-steel scaffolding units or from tube-and-coupler scaffolding components fitted with casters. In addition to these, there are two types of aluminum equipment. Aluminum-section rolling scaffolds are made up of end frames and braces, generally have dimensions of 4½ x 6 feet, and are designed with an interior stairway. Aluminum sectional ladder scaffolds are erected from 2-foot-wide ladder units of various heights. There are innumerable uses for these extremely portable, strong, and easily managed units.

These basic safety suggestions should be followed with rolling scaffolds: (1) Do not erect a rolling scaffold higher than recommended by the manufacturer. (2) Avoid overloading. (3) Keep scaffold from being struck by trucks or other equipment. (4) Erect guardrails around working platforms. (5) Neither roll the scaffold with workmen on it nor allow workmen to pull themselves along on the scaffold.

Westinghouse-Le Roi Deal

Westinghouse Air Brake Co., Wilmerding, Pa., has purchased a majority interest in Le Roi Co., Milwaukee, Wis. Le Roi, founded in 1916, is a manufacturer of engines, portable compressors and rock drills. Le Roi, with three divisions (Milwaukee, Wis., and Cleveland and Greenwich, Ohio), will retain its name, organization, officers, employees, plant locations, and operations.

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A Thing of Beauty
A. I. S. C. Winners

(Photos on page 2)

Since 1928, a jury of architects and engineers has been pronouncing its verdict in a beauty contest. This year, no exception, the American Institute of Steel Construction, Inc., New York, N. Y., has surveyed a field of 97 and announced the winners who will receive stainless-steel plaques, and seven runners-up for honorable mention certificates. That's right, they're bridges—the most beautiful steel ones in the United States opened to traffic in 1951—and the contest was the Institute's annual Aesthetic Bridge Competition.

The winners are:

Class I, for bridges with spans of 400 feet or more—Delaware Memorial Bridge, 3 miles south of Wilmington over the Delaware River: owner, State of Delaware; designer, Howard, Needles, Tammen & Bergendoff, New York City and Kansas City; consulting engineer, O. H. Ammann; consulting architect, A. Gordon Lorimer; fabricator, American Bridge Co.

Class II, for bridges with spans under 400 feet, costing over $500,000—Forebay Channel Bridge, Davis Dam project, Arizona-Nevada: owner, U. S. Bureau of Reclamation; designer, U. S. Bureau of Reclamation, Denver, Colo.; fabricator, American Bridge Co.

Class III, for bridges with spans under 400 feet, costing less than $500,000—Grove Street Overpass, Route 128, Lexington, Mass.: owner, Massachusetts Department of Public Works; designer, Thomas Worcester, Inc., Boston; fabricator, West End Iron Works, Cambridge, Mass.

Class IV, for movable bridges—Harlem River Pedestrian Bridge, East 103 St., Manhattan to Ward's Island, New York, N. Y.: owner-designer, Triborough Bridge and Tunnel Authority, New York, N. Y.; consulting engineer, O. H. Ammann; fabricator, American Bridge Co.

The following bridges were given honorable mention:

Class I—Los Alamos Canyon Bridge, Los Alamos, N. Mex.; and Atchafalaya River Pipe Line Suspension Bridge, Melville, La.

Class II—Basilone Memorial Bridge over Raritan River, New Brunswick, N. J.

Class III—Morningside Drive Underpass, North-South Freeway, Fort Worth, Texas; Sacramento River Bridge, Shasta Dam, Central Valley Project, Calif.; and Spillway Bridge, Cedar Bluff Dam, Kans.

Class IV—Seabright Bridge over South Branch, Shrewsbury River, between Rumson and Sea Bright, N. J.

Packaged Pump Line

A packaged line of close-coupled pumps is made by Aurora Pump Co., 68 Loucks St., Aurora, Ill. The types SAC and JMC cover a capacity range from 5 to 150 gpm and heads from 0 to 110 feet at speeds of 3,500 rpm. They include 29 combinations—in ¾, 1¼, 1½, and 2-inch sizes with either single or 3-phase motors. The casings are vertically split—pump and motor are supported on feet cast integrally with the pump; suction is located on the end and discharge is vertical.

Mechanical seal is standard on all sizes and easily replaced without disturbing suction or discharge connections. The impeller is balanced, of the enclosed type, made of high-grade bronze, and can also be removed without disturbing suction or discharge connections. The motor is built to NEMA specifications and equipped with a stainless-steel shaft. These pumps are also packaged as pump, base, and coupling units.

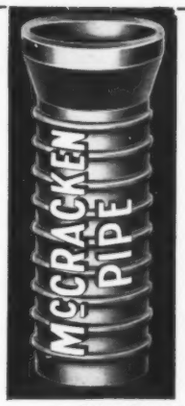
Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 941.

A-C Appoints Paris Manager

George A. Gillespie has been appointed Resident Manager of the Paris, France, office for the Tractor Division of Allis-Chalmers Mfg. Co., Milwaukee, Wis. In this position he will supervise sales of the company's Tractor Division products throughout continental Europe. Since joining Allis-Chalmers in 1948, Mr. Gillespie had been Territory Sales Manager for Europe, North Africa, and the Middle East, with headquarters in Milwaukee.

The Paris office is located at 2 Rue Paul Cezanne, Paris, VIII.

Make this in 30 seconds



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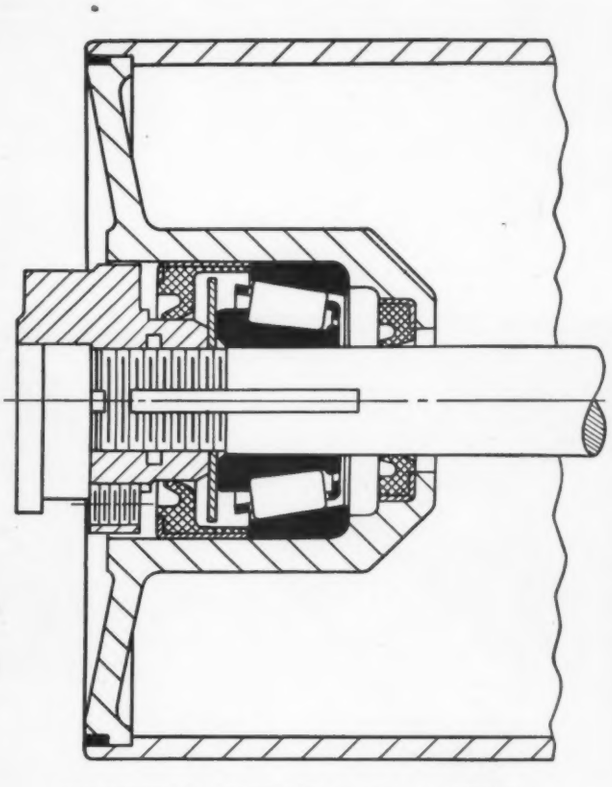
To insure long life and keep maintenance costs down, Continental specified Timken® tapered roller bearings for its new type UST idler. Because Timken bearings keep idler shafts concentric with housings, closures are made more effective. Lubricant is retained, dirt and moisture kept out. Operation is more economical.

Timken bearings have exceptional load-carrying capacity because of line contact between rollers and races. And due to their tapered construction, Timken bearings carry both radial and thrust loads in any combination.

Because of their true rolling motion and extremely smooth surface finish, Timken bearings reduce friction and wear. Idlers turn freely, easily. Belts last longer.

No other bearings give you all the advantages of Timken bearings. Specify them for the machines you build. Make sure they're in the machines you buy. Always look for the trademark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



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World's Costliest Road

Two scrapers churn their way along the unfinished highway through the longest cut, one of the largest in the world, of the Autopista.

Venezuela's 10-Mile Link Between Caracas And the Caribbean to Cost $60,000,000

• THE most expensive highway in the world—costing nearly $6,000,000 per mile—is being carved through the Andean foothills of northern Venezuela, and some first-class engineering is going into the project.

Two giant tunnels, one of them over a mile long, and the three largest prestressed-concrete bridges in the world mark the route of the new four-lane superhighway as it sweeps down 10½ miles from the capital of Venezuela to the Caribbean shore. Caracas itself lies in a 3,000-foot-high valley hidden from the sea by the massive Andean hills, which—like guardians of the northern coast of the South American continent—tower up to 6,000 feet over the Caribbean.

Two thousand workers with over 200 bulldozers, tractors, trucks, and road scrapers are scheduled to complete the job in time for the tenth Inter-American Foreign Ministers Conference, which is to meet at Caracas some time during the last quarter of 1953.

Hamilton Wright Photos

Scrapers and tractors with all brakes locked skid down this 60-degree, 130-foot incline as they fill in over large drainage culvert to bring road up to grade.

Huge Cat scrapers and tractors move along in a procession-like column, transferring tons of earth to level off a section in the rugged foothills of the Andes.

"Sows" Wealth Back Into Land

Venezuela's great Autopista—as the superhighway is called—is the result of six years of surveys and studies by the Venezuelan Ministry of Public Works, and the project is an example of the Government's policy of "sowing" its oil wealth back into the land. Construction began in January, 1950, and the estimated total cost is $60,000,000.

The Autopista will serve as a new strong lifeline linking the Venezuelan capital to its busy airport at Maiquetia (starting and landing point for some 200 national and international flights daily) and the seaport of La Guaira, which handles nearly 50 per cent of all Venezuelan imports. The new highway

is expected to provide a great impetus to the development of coastal property, and many new resort areas are already under construction so as to be ready to take of the anticipated surge of vacationers.

The present highway is a 19-mile dizzily twisting route with 365 curves precariously niched in the steep Andean hills. Traffic is heavy. Approximately 6,000 cars and trucks carry passengers and freight to and from the ports each day. Average driving time is about an hour. By way of contrast, the Autopista, with only 36 curves, will cut driving time to 15 minutes. The curves will have a minimum radius of 328 yards compared to 16 on the present highway. The maximum grade on the Autopista will be only 6 per cent—and as low as 3.5 per cent in the tunnels—compared to 12 per cent on the existing road.

Three Giant Bridges

The world's three largest prestressed-concrete bridges, costing approximately $5,000,000, are being constructed on the Autopista by Entreprises Campeon Bernard of Paris, France, under the direction of Robert Shama, Project Manager and Chief Engineer.

Bridge No. 1, near the Caracas end of the superhighway, is the largest of the three. It is the largest concrete-arch bridge in the Western Hemisphere and the fifth largest in the world. Total length of the bridge is 1,030 feet. It is 70 feet wide and 220 feet above ground. The shoulders of the highway become extra lanes on each side of the bridges, thus giving the bridges six traffic lanes, three on each side of a 4-foot center island. In addition, there is a sidewalk 2 feet 4 inches wide that runs along on

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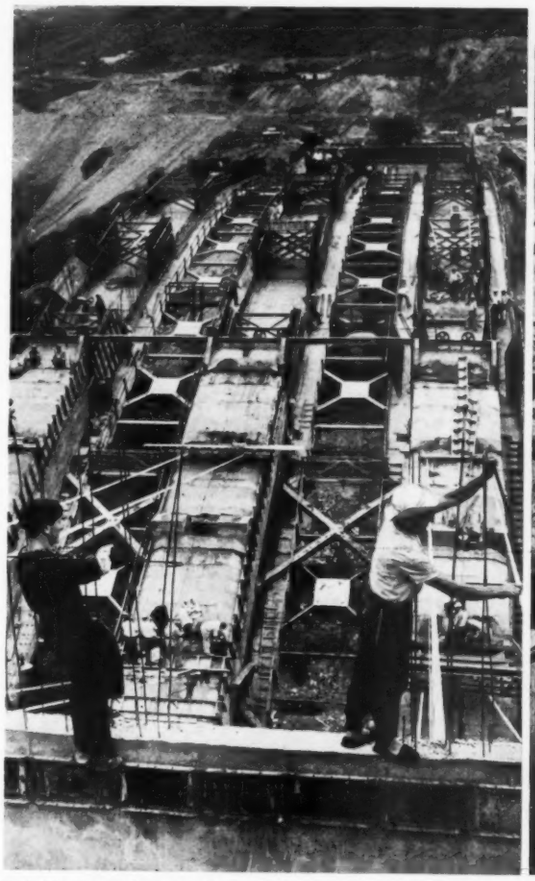
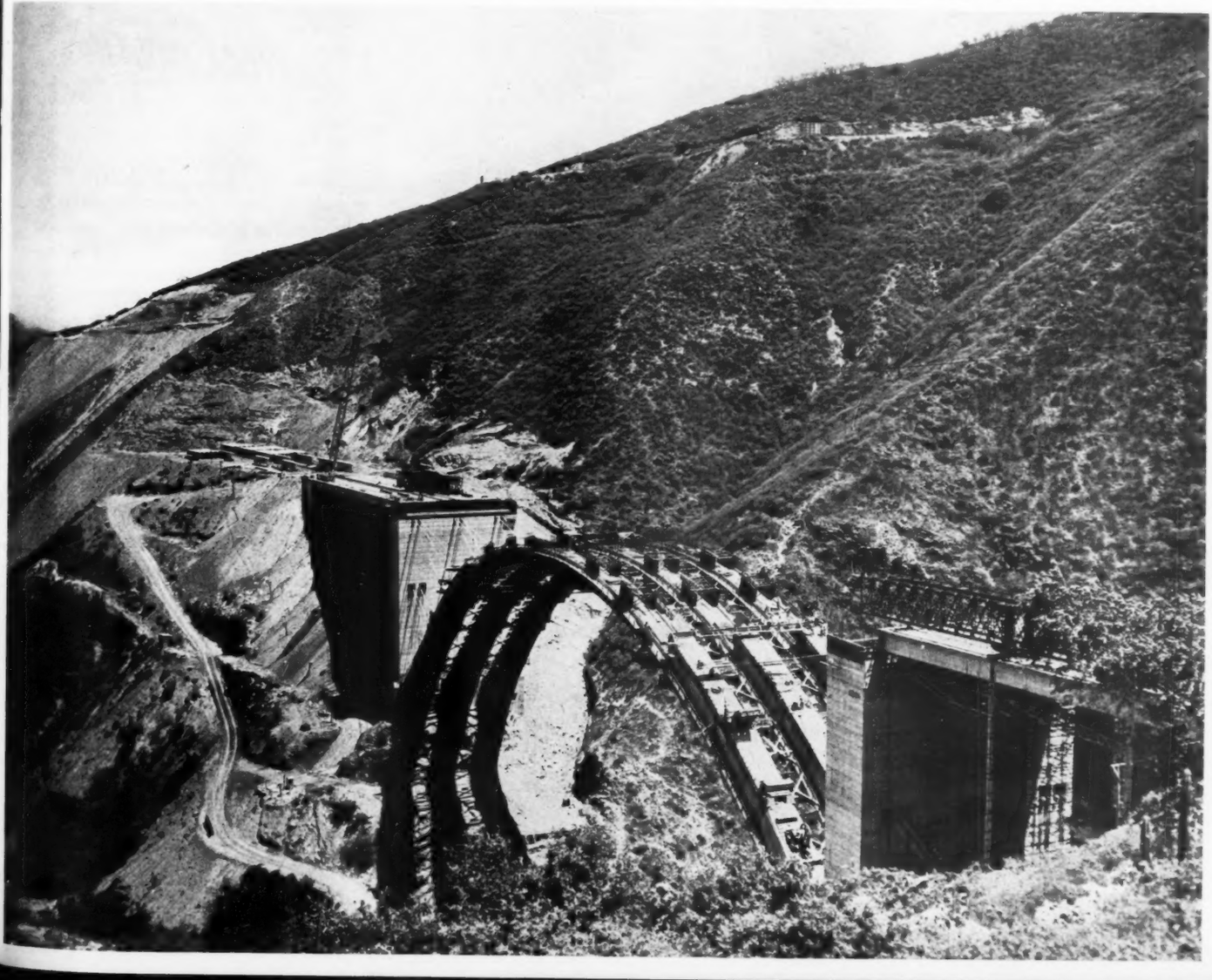


Probably the most spectacular operation in the whole Autopista project was the hoisting of the center section superstructure for bridge No. 1, the largest prestressed-concrete bridge in the world. The center section superstructure, built of wood and steel wire reinforcing, was assembled on the ground (above) and then hoisted, through a series of pulleys, into place (photo below).



Costliest Road Runs Through Andean Hills

(Continued from preceding page)

each side of the bridges.

A new method of bridge construction was used by Eugene Freyssinet, one of the developers of prestressed concrete and Consulting Engineer of Campeon Bernard, to build the 500-foot span of bridge No. 1, which consists of three arches. Due to the bridge's width and great height above ground it would have been extremely difficult and uneconomical to build the center span by conventional procedures. Mr. Freyssinet designed a new method of building falsework, suspending it piece by piece to the main piers and concreting over these pieces as soon as they were lifted, until one-quarter of the span was completed on each side of the bridge.

The falsework for the remaining half of the span, 265 feet in length and weighing approximately 220 tons, was built as a single unit on the valley floor beneath the bridge. The falsework was then slowly lifted by four 10-hp electric winches over a period of two days until it was raised into its required position and fixed to the protruding quarter spans on either side of the bridge.

The three arches comprising the center span of bridge No. 1 are of the hollow-girder type. The bottom flanges of the box girders are only 9½ inches thick, the webs 7¼ inches, and the top flanges 19 inches thick.

Foundations Were Difficult

The foundations of the 500-foot arch also presented engineers with a difficult problem. Due to a geological break, the foundation ground was entirely different on either side of the valley. On the La Guaira side, the bridge builders had to go to a depth of approximately 60 feet below the surface and at that level build a general raft to distribute the enormous 16,000-ton load coming from the arch, and the main pilaster and deck. This general raft was built as a hollow caisson, entirely prestressed.

On the Caracas side of the valley the foundation ground was not suitable for a general raft, and a completely different type of structure was designed. The loads and thrust brought by the bridge were supported by a series of seven vertical handmade piles, each 6 feet in diameter and 60 feet deep, which received the vertical component of the reaction, and by three inclined galleries 100 feet deep to take care of the thrust.

For every mile of the Autopista Highway, three miles of secondary roads had to be built to move men and equipment.

The main piers of the bridge are hollow box-like structures, approximately 120 feet high and 20 feet wide with walls 4½ inches thick.

The access viaduct on the La Guaira side of the main pier is 300 feet long and consists of six 48-foot-long spans. On the Caracas side the access viaduct is 150 feet long and consists of three 48-foot spans. The piers supporting these spans vary from 30 to 100 feet in height. They are very slender structures, hinged at the foot and fixed at the top in the deck.

The deck over the central arch allows for expansion and contraction. This is achieved by fixing the deck to the crown of the arch and letting it expand from the crown toward both ends of the bridges. The hinges at the foot of the supporting piers, as well as the flexibility of these piers, allow the expansion and contraction movements.

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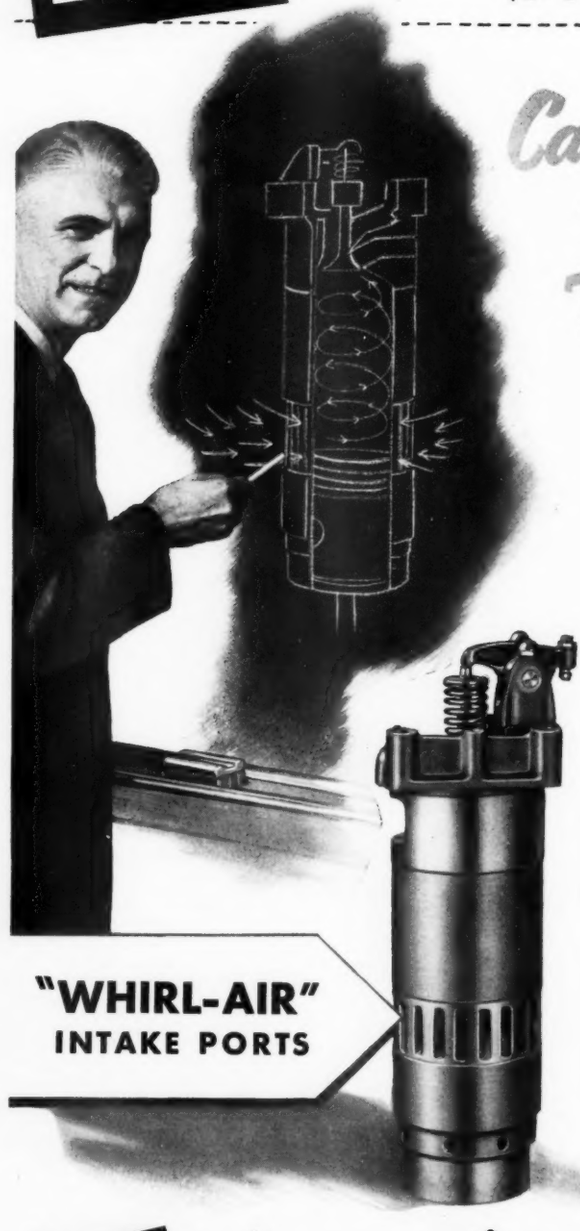

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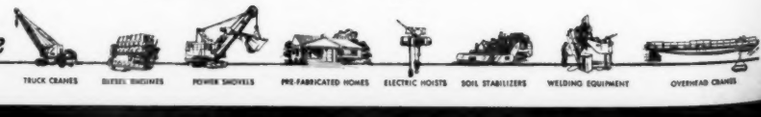

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Prefabrication, Prestressing

All the deck slabs and main and cross girders of all three bridges have been prefabricated on the spot in steel molds on vibrating tables, in order to obtain finished products of the highest possible quality. These prefabricated beams weigh between 22 and 25 tons and are placed in position by a traveling gantry with a 60-foot cantilever. The beams arrive on a narrow-gage railway track, are engaged in the gantry, picked up, and taken out of the cantilever part of that gantry to be placed in position in the following span. After the 8 beams and 112 slabs composing one span have been placed in position, the whole system is tied together by prestressing cables to form a complete unit.

Bridges No. 2 and No. 3 are still under construction, but No. 1 is finished. Engineers started pouring its foundations on March 30, 1951, and it was completed during the summer of this year. Above its foundations the bridge required only 7,000 cubic yards of concrete, 156 tons of mild steel (plain reinforcing bars), and approximately 100 tons of special hard steel for prestressing.

The dimensions of bridge No. 2 are almost equal to that of No. 1. It will be 820 feet long with a 478-foot span 220 feet above ground. Bridge No. 3 will be 680 feet long with a 453-foot span 130 feet above ground.

Commenting on the desirability of prestressed concrete, Chief Engineer Shama said, "The prestressed system, as now used the world over, has proved very much more economical than ordinary reinforced concrete. It has made possible the construction of some very large structures which to date are world records of span and which could not have been built in ordinary reinforced concrete."

Bridge Personnel

Working on the bridges is a labor force of some 300, including a large number of recent immigrants to Venezuela: Italians, Germans, Austrians, and Slavs. To supervise the construction projects, Campeon Bernard sent a staff of only 17 men from Paris, including all engineers, foremen, and accountants. The company maintains communication between its Caracas office and the bridge location by means of short-wave radio.

As well as Chief Engineer Shama, Campeon Bernard engineers on Venezuela's bridge project are: D. Martin, Assistant Manager; J. Dacaine and J. Paroonagian, Superintendents; J. Duau, in charge of construction of arches; P. Loup in charge of prefabrication of deck beams and slabs; K. Pedersen, in charge of general work and the erection and assembly of the prefabricated deck; and A. Gallico, in charge of all prestressing.

Two Pairs of Tunnels

The two tunnels on the Autopista are being constructed at a cost of approximately $20,000,000 by the only other foreign company working on the project—Morrison-Knudsen Co., Inc., of Boise, Idaho.

Each tunnel is actually a pair of twin tunnels, separated by a natural mountain wall 13 yards thick, with a dual lane of one-way traffic on either side of the wall. The tunnels were designed by Ralph Smillie of Smillie & Griffin, a New York consulting-engineering firm, in accordance with the most rigid safety specifications and most advanced methods of tunnel construction. The tunnels will have a modern ventilation system that automatically adjusts the intake of fresh air in proportion to the concentration of carbon monoxide left by the varying flow of traffic. Along the larger tunnel—1,940 yards long—two vertical galleries have been constructed at points approximately one-third the length of the tunnels. These galleries reach up from the tunnels about 120 feet to the surface of the mountain and are used to inject fresh air into the tunnels and expel the combustion gases issuing from the exhaust pipes of passing vehicles. The tunnels will have a modern illumination system, and, in addition, an automatic traffic-control system for use in emergencies will be installed as well as fire-control apparatus.

At the north end of the smaller tunnel a building will be constructed to house the controls for the automatic traffic-regulating and ventilating systems. The larger tunnel will have buildings at both ends to house the automatic controls of its twin tunnels.

A central control house will be built near the Caracas side of the larger tunnel. It will have specially designed electrical panels controlling the ventilation, illumination, traffic, and emergency signals of both tunnels. At this building, emergency crews will stand by ready to clear the tunnels and highway of any accident or breakdowns.

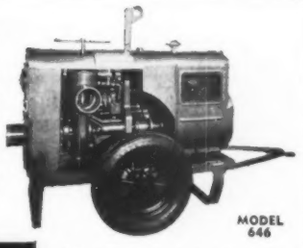
Excavation of the smaller tunnel, 502 yards long, has already been completed. In the larger tunnel, excavation has been completed along a length of 1,500 yards and is continuing at the rate of 20 feet per day in each of the twin tunnels. The smaller tunnel required the removal of 74,000 cubic yards of dirt and rock, and an estimated 821,000 cubic yards will be removed in the construction of the larger tunnel.

At the time of writing, 2,577 tons of steel had been used for supporting I-beams in the tunnels.

(Concluded on next page)

IT'S HERE AT LAST!

A sure way to save money on your next wellpoint job is to get Foundation's new 4" 1000 GPM capacity pump . . . sturdy, compact, for medium and small wellpoint jobs. Why use big 6" and 8" pumping units and pay big fuel bills when you can use this efficient 4" pump, tailor-made for the job? Economical to operate and maintain . . . easy to move around.



MODEL 646

4" unit powered by 4-cylinder gas engine

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Clipper "SAILS RIGHT THRU" CONCRETE SAWS

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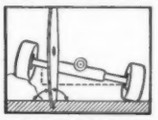
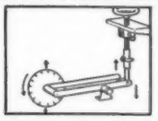
4 wheel — Perfect Control, tips back and turns on a dime

Saw 12 feet per minute in Asphalt or 5 feet per minute, 1 inch deep, in cured limestone Concrete. With Clipper you can saw up to 6½ inches deep. Concrete Sawing is Practical and Profitable because Clipper Concrete Saws are Built with the experience of World's Largest Manufacturer of Masonry Saws.

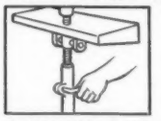
Experience Proves A Concrete Saw Must Have These Clipper Features:



1. Clipper "No Bind" Floating Three Point Suspension Automatically protects blade.



2. Positive Screw Feed Instant control raises or lowers blade smooth, easy.



3. Adjustable Depth Lock Set this handy stop for whatever depth desired.

4. Patented Spray Control Its value is measured in increased Blade Life.

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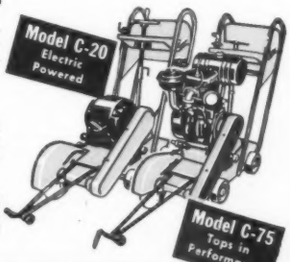
FAST—EFFICIENT—ECONOMICAL

Clipper Concrete Saws *CUT* through the toughest concrete, wherever patches, trenches, openings or contraction joints are needed.



Model C-20 Electric Powered

Model C-75 Tops in Performance

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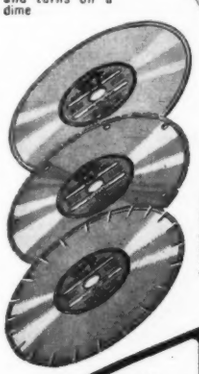
Eliminate radial cracks. Stop spalling. Have perfect jobs. Architects, Consulting Engineers, City and State Engineers are solving their problems by specifying "Saw before Breaking"

Utility Companies enjoy lower costs while improving Public Relations. Concrete Contractors praise the ease of getting the tough job done with new found profits!

Patent Numbers 2338318, 2455113, 2492684 — Other Patents Pending—Printed in U.S.A.



GENUINE CLIPPER DIAMOND BLADES

Regardless of the Material you plan to Cut...Limestone, Flint, Gravel, Aggregate Concrete Green or Well Cured, or Asphalt . . . there's a Clipper Diamond Blade to cut fast and economically.

PATCH Saw clean straight lines, break smooth — Size and shape make no difference

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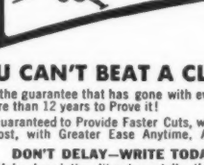
CONTRACTION JOINTS Highways, Streets, or Building Floors precision cuts eliminate hand tooling



POLES Installing new City lights? Clipper Concrete Saws prevent radial cracks

DRIVES—WALKS Prove the job can be small and still make concrete sawing profitable

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Costliest Road Runs Through Andean Hills

(*Continued from preceding page*)

Ministry's Over-All Job

The Ministry of Public Works is constructing all of the Autopista with the exception of the bridges and tunnels, and over-all supervision of the highway is being directed by Engineer Henrique Siblesz, of the Ministry.

Before work on the Autopista could get under way the Ministry had to cut 36 miles of secondary roads across the mountains to provide access to principal construction points.

The route required a number of massive fills in mountain gaps, 13 of them ranging from 78 to 141 feet in height. Public Works engineers practically sliced off the tops and sides of some mountains to get the dirt needed to fill in the giant gaps. Concrete culverts underneath the fills, permitting the passage of mountain streams, were built by four Venezuelan companies. Across a mountain near the La Guaira end of the superhighway, the Ministry of Public Works excavated what is considered to be one of the largest open cuts in the world. It is 105 yards deep.

The dual lanes of the superhighway, 24 feet wide on each side of a 4-foot-wide center island, will be paved with asphaltic concrete.

New telephone cables from Caracas to Maiquetia and La Guaira will be laid in the center island of the highway. The highway will be illuminated along its entire length.

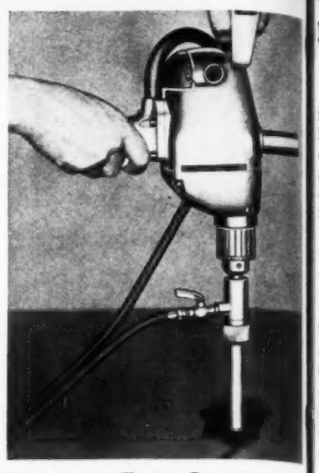
The Ministry of Public Works has purchased a right-of-way 82 yards wide on either side of the Autopista for an elaborate highway-landscaping operation. The Ministry of Agriculture is cooperating in this program and has established two experimental stations along the route to determine what plants and shrubs are best suited for use in landscaping and prevention of soil erosion.

Under study at present is a plan for nominal toll charges by which the Ministry of Public Works estimates it will be able to amortize the cost of the Autopista in approximately 20 years. Toll stations, with automatic electrical controls determining the classification of each vehicle and its respective toll charge, will be established at either end of the Autopista.

Once the superhighway from La Guaira is completed, the Ministry of Public Works is ready to carry out plans to extend it an additional eight miles through the busy capital city as part of its "Extraordinary Highway Plan" designed to give Venezuela the best in modern public-highway systems. Venezuelan Minister of Public Works is Gerardo Sanson.

Heads Trailmobile Export

Edward L. O'Neill has been appointed Export Manager of Trailmobile, Inc., Cincinnati, Ohio, a subsidiary of Pullman, Inc. The newly created Export Department is located at 52 Vanderbilt Ave., New York, N. Y.



Cooling Attachment For Diamond Drills

A new water-cooling attachment for use with diamond drills is announced by Wheel Trueing Tool Co., 3246 W. Davison Ave., Detroit 6, Mich.

The Truco water swivel can be mounted in a ½-inch chuck or any standard portable or stationary power drill. It will take any size diamond drill from ¼ to 2½ inches in diameter. A heavy-duty model is made for bits over 2½ inches. In locations where the coolant water might cause damage a special drain is connected to the drill and a receptacle.

The company points out that the water swivel with diamond bits saves time in drilling hard nonferrous materials such as granite, concrete, brick, and marble. The unit comes with 10 feet of hose and an adapter.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 942.

Towne Is Brown & Root V. P.

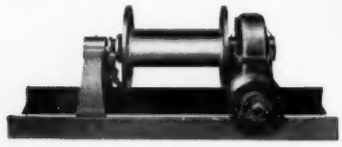
I. N. Towne has been elected a vice president of Brown & Root, Inc., Houston, Texas, engineering and construction firm. He was recalled from the island of Guam where, for the past six years, he had been Project Manager of a large construction contract with Brown-Pacific-Maxon, a joint-venture group composed of Brown & Root, Inc., Pacific Bridge Co., and Maxon Construction Co., Inc.

His headquarters will be in Houston.

TULSA POWER WINCHES

FOR *Special Purposes*

Whether your job is lifting, pulling, loading or hauling, it can be better, easier and more safely handled with a Tulsa Winch. Tulsa Winches for trucks and crawler tractors are equipped with automatic worm brake designed to hold the load suspended. Load can be lowered only by using power. Highest quality materials and precision workmanship assure you of long, trouble-free efficient service. Tulsa Winches are available in capacities from 6500 to 80,000 lbs. For additional information and illustrated literature showing how you can profit with Tulsa Winches, see your nerest Tulsa Winch distributor or write direct to the manufacturer.



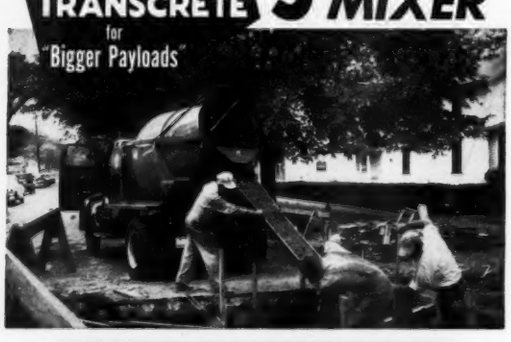
This Model 10 Tulsa Winch is used by a commercial chemical fertilizer manufacturer to spot freight cars for loading and unloading. It is powered by an electric motor and does not use lever controls.

Tulsa* Winch
TULSA, OKLAHOMA DIVISION OF VICKERS Inc.

*Reg. U. S. Pat. Off.

MIXES -AGITATES TRANSCRETE for "Bigger Payloads"

3 YARD MIXER



THE COMPLETE MACHINE FOR MAXIMUM PAYLOADS

1. Continuous "L" shaped blade construction — for quicker charging — mixing — discharging.
2. Quiet, smooth roller chain — cut sprocket drive absorbs all shock.
3. Hardened nickel alloy steel drum rollers — Twin Timken mounted.
4. Clutch and Throttle Controls at either end of drum — Reached from catwalk.
5. Extra high discharge with hinged one-man chute.

CONSTRUCTION MACHINERY COMPANIES
WATERLOO, IOWA

WELLMAN *Williams Type*

PERFORATED DRAGLINE BUCKET

speeds the wet jobs

• You get big loads fast with this Wellman Perforated Dragline Bucket because excess water goes out while gravel stays in on jobs such as illustrated.

Built of special alloy steel—all welded for strength plus light weight. You can work faster with less maintenance with Wellman dragline buckets.

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Earthquake Damage Rapidly Cleaned Up

Shortly after dawn on July 21, California trembled. The earthquake at Bakersfield and Tehachapi went as quickly as it came, but behind it lay a path of human misery, paralyzed commerce, and an initially estimated $1,500,000 worth of damage.

The Southern Pacific Railroad had four debris-clogged tunnels. Morrison-Knudsen Co., Inc., Boise, Idaho, took the job of moving an estimated 750,000 to 900,000 cubic yards of earth. The company hired every available contractor and his equipment. Fifty Caterpillar diesel tractors, 30 scrapers, and two No. 12 motor graders, together with six Gardner-Denver 500 compressors, participated. Project Manager was H. L. Leventon.

Three miles of roadway were carved out to permit easy access to the tunnels. This was done in half a day by ten Caterpillar D8's. Working two 10-hour shifts 350 men "daylighted" (made into deep cuts) three tunnels and salvaged the fourth. In this last tunnel, the men worked in constant fear. For one of the more than 200 "afterquakes" might have brought the entire structure crashing down on their heads.

A Caterpillar D8 tractor (upper left) was one of 50 used in restoring service on the Southern Pacific Railroad, Calif., after the July earthquake had clogged four tunnels. Entrance to one of the tunnels is partially covered by this landslide.

Protests Government Policy On Overseas Air-Base Work

In his midyear survey, James H. Dillon, President of the Construction Men's Association of New York City, reviewed some of the foreign air-base work being done for the use of our armed services. The list embraced work in Turkey; in Okinawa, which is expected to be the "Gibraltar of the Pacific"; in France, where one of the largest depots in the world is being built at Chateauroux; in Greece; in Labrador; and in New Brunswick, Canada.

Mr. Dillon, as head of CMA, represents 10,400 American construction men who have made a career of working abroad for American construction firms. He is therefore distressed by the U. S. Government's present policy of turning over this foreign air-base work to foreign construction firms and native labor. He points out that the Turkish work is to be done by German and Turkish firms using about 400 men and only 6 American engineers; that Japanese and Philippine contractors will do all the work on Okinawa; that construction and supervision at Chateauroux is 100 per cent French; that the Greek naval air base will take 100 per cent Greek labor and management; that 3,000 Canadians will be employed on Labrador bases and only 125 Americans; and so forth. Mr. Dillon is also alarmed for security reasons, since he reports that many of the foreign nationals employed on the air-bases are Communists and hence in a position to damage the field seriously.

A further cause of dissatisfaction voiced by Mr. Dillon is the policy of only hiring men under fifty for defense work. In this connection, CMA urged Dr. John R. Steelman, Acting Director of Defense Mobilization, to issue a supplementary memorandum to Manpower Policy No. 7 in order to make its provisions specially applicable to hiring of labor for overseas defense construction. Policy No. 7 already deplores the waste of needed skills and experience caused by this "under-fifty" attitude in domestic-employment hiring. CMA feels the same way about overseas defense work. A man's past record of accomplishment—not his age—should be the criterion when foreign-job contracts are being given out, thinks Mr. Dillon.

Hyster Moves Offices

Hyster Co., Portland, Oreg., manufacturer of industrial trucks, tractor tools, and logging equipment, has moved the industrial truck sales and service departments of its Eastern Division, from Peoria to Danville, Ill. The new offices are housed in a modern newly completed office building adjacent to the manufacturing plant.

The new Danville sales organization covers 40 states east of the Rockies and the eastern part of Canada and is served by 35 dealer establishments.

BORINGS & ROCK HOLES
Test Borings, Diamond and Shot Drilling, Inclined Holes, Calyx Drilling for Foundations, Elevators, etc.
GILES DRILLING CORPORATION
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B.F.Goodrich

Tires roll over razor-sharp rock —defy cuts and bruises

LEAD and zinc come from rock that shatters into countless sharp, jagged splinters. Trucks hauling these metallic elements roll over roads filled with this abrasive, razor-edged rock — rock that slashes and chews tires to shreds in a matter of weeks.

Not so with the tires pictured above. They are B. F. Goodrich tires, designed to carry giant loads in just such operations. The Universal tread is compounded to resist rock bruises and cuts. Husky, wedge-shaped lugs give positive two-way traction, protect against side slippage even on soft ground.

Like all B. F. Goodrich off-the-road tires of 8 or more plies, Universal tires are built with the exclusive nylon shock shield. Layers of rubber-coated nylon cords under the tread rubber stretch together under impact, protect the tire body from the smashing shocks of off-the-road work.

This shock shield gives you the added savings of greater tire mileage, increased bruise resistance, more recappable tires and less danger of tread separation. All these advantages, yet the nylon shock shield costs nothing extra. In sizes 12.00 and larger, Universal tires have *double* nylon shock shield — twice the protection for even the roughest work. No wonder operators across the country report more hours of service with B. F. Goodrich tires.

B. F. Goodrich builds on or off-the-road tires to meet all your needs. See your local dealer — he'll be glad to show you how to save money and get longer tire life — or write direct to: *The B. F. Goodrich Co., Akron, Ohio.*

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

A Scoop Attachment

A front-end attachment that may be applied to any basic full-revolving TL-25 shovel turntable is announced by The Thew Shovel Co., 28th St. and Fulton Road, Lorain, Ohio. The Scoop Shovel is interchangeable with standard shovel, crane, clamshell, dragline, and hoe attachments. It is equipped with a 1¼-yard dipper in place of the ¾-yard dipper used on the standard TL-25 shovel.

The Scoop Shovel consists of a short rugged boom 8 feet 6 inches in length, at the front end of which is located a cable-driven shipper shaft with pinions at the outer ends of this shipper shaft.

The dipper is attached to a double dipper stick which is crowded in or out in a telescopic manner through dipper-stick sleeves rigidly fastened to the outer end of the boom. The underside of each dipper stick is equipped with a rack or teeth which mesh with the pinions on the outer ends of the shipper shaft. Thus by proper control of the reversible shipper shaft, the dipper and dipper stick may be crowded out or retracted. Depending on the position of the boom, the machine can load on down-grade, on a level grade, or on an up-grade. When the boom is lowered to a horizontal position, the dipper may be moved in or out through a stroke of 6 to 7 feet.

The Scoop Shovel is a front-end attachment that may be applied to any TL-25 shovel turntable and is interchangeable with standard attachments. Here it is busy loading in an Ohio limestone quarry. The Thew Shovel Co. makes it.

The entire front end is raised for sumping operations by a three-part hoist line. The dipper is dumped by tripping a release which is actuated through a convenient lever next to the operator and which may be engaged by a nudge of the operator's elbow.

While its action is essentially horizontal-skimming, the bucket can be pushed into the material at any elevation and can be pushed straight out, or can be lifted vertically, or in any combination of the two motions.

The Scoop Shovel will stand in one place and swing the load from face to trucks. In this manner, it is capable of making three to four passes per minute.

On underground operations it can travel through entries 9 feet 6 inches high and can operate in headrooms as low as 10 feet 6 inches.

Further information may be secured from the company. Or use the Request Card that is bound in at page 18. Circle No. 943.

Self-Powered Mower

A new unit with a full-floating and reversible steel tubular handle, that mows in either direction and trims back, front, and either side, is announced by The Moto-Mower Co., 4600 Woodward Ave., Detroit 1, Mich.

The Roto-Cub 16 has a chassis of 14-gage pressed steel, reinforced, and full axles across the body of the machine for added strength. It is said to be easily adjusted for cutting height and the wheelbase is of proper length to allow cutting over rough ground without scalping.

Standard equipment includes a clutch between the motor and the blade, as an additional safety precaution, and heavy front and rear guards. The Roto-Cub is powered by a 1¼-hp 4-cycle vertical-shaft engine. The wheels are semipneumatic-tired.

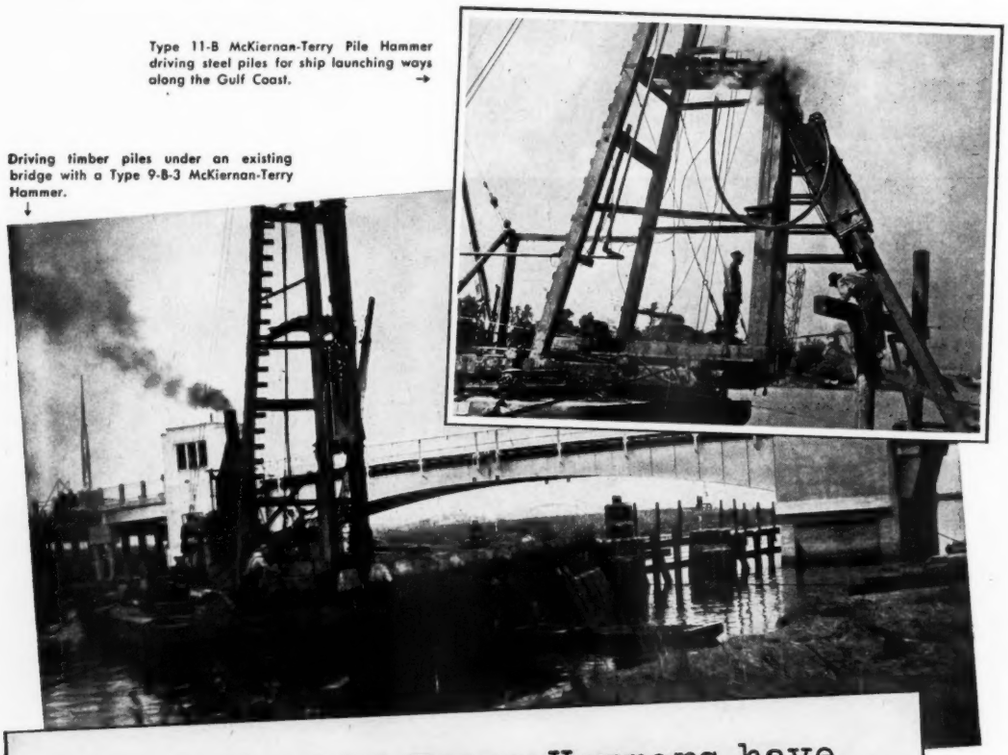
Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 894.

R. V. Hyland Dies

Richard V. Hyland, a founder of Madigan - Hyland, Consulting Engineers, died last September. He and M. J. Madigan formed their partnership in 1929 and soon gained the reputation of not only being among the low bidders, but of always doing the job right and on time. The firm was consultant on such projects as the Triborough and Bronx-Whitestone Bridges, the Belt Parkway, the Henry Hudson Parkway, and the reclamation of the site of the World's Fair in Flushing, N. Y. At present it is serving as consultant to the New York State Thruway Authority in the building of the superhighway between New York and Buffalo and as construction engineer for the bridge across the Tappan Zee linking the Rockland and Westchester County sections of the Thruway.

Type 11-B McKiernan-Terry Pile Hammer driving steel piles for ship launching ways along the Gulf Coast. →

Driving timber piles under an existing bridge with a Type 9-B-3 McKiernan-Terry Hammer. ↓



"Our McKiernan-Terry Hammers have consistently made money for us"

The Spence & Howe Construction Company of Port Arthur, Texas, is one of thousands of contractors who have profited by using powerful, fast-acting McKiernan-Terry Pile Hammers. President O. B. Hartzog reports:

"Our two McKiernan-Terry Pile Hammers have always performed beyond expectations and with a minimum of maintenance. They have consistently made money for us, particularly on jobs involving batter piles and difficult places to maneuver heavy pile driving equipment, such as under existing bridge spans, inside of buildings and close to existing refinery units."

On tough or easy jobs, contractors have discovered that McKiernan-Terry equipment more than pays its way. Get the facts on the wide-range McKiernan-Terry line including 16 sizes of hammers and 2 sizes of extractors. Write for bulletin.

Other McKiernan-Terry Products

MEAD-MORRISON COAL AND ORE UNLOADERS AND BRIDGES
Available in a variety of designs and in capacities of 300 to 1500 tons per hour. Exceptional durability proven by installations in service for half a century. Simple controls afford convenient, comfortable and speedy operation.

GRAB BUCKETS
Range of types and sizes take bulk materials loads up to 25 tons. Ruggedness without excess weight.

HONING UP TO 42-IN. I.D. X 55-FT. LONG
Typical of the extensive facilities of McKiernan-Terry for unusual jobs.

McKIERNAN TERRY

McKIERNAN-TERRY CORPORATION • MANUFACTURING ENGINEERS • 19 PARK ROW, NEW YORK 38, N. Y.
Plants: Harrison, N. J. and Dover, N. J.

MK 327

WON'T QUIT
or cause time out

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

The Hayward Company
32-36 Dey Street
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Hayward Buckets

Ore Crosses River By Aerial Tramway

Magnet Cove Barium Corp. Links Ore Field to Plant Site With Carriers Traveling on Suspended Track

By CHARLES F. DWYER
Staff Engineer, Heron Engineering Co.

• A TRANSPORTATION problem faced the Magnet Cove Barium Corp., Magnet Cove, Wyo., when it decided to build a plant for the processing of bentonite, deposits of which were known to be available in the area east of Greybull, Wyo. Because of lack of utilities, railroad siding, and roads, however, the company found that the nearest suitable site was north of Greybull. Between the ore field and the plant site ran the Big Horn River. The most obvious answer—a bridge—was economically prohibitive because U. S. Army restriction demanded high clear spans over the river at this point. To use existing bridges would have meant adding a 6-mile haul to the plant site, partly over nearly impassable roads.

A 1,600-Foot Tramway

The solution of the problem was an aerial tramway, which offered physical, economic, and time-saving advantages. Heron Engineering Co., Denver, Colo., was awarded the contract, and construction got under way under the supervision of the company's Staff Engineer, Charles F. Dwyer.

A tramway some 1,600 feet in length with a 60-ton-per-hour capacity was needed, and various types were considered. In the end, such factors as the nature of the terrain, the distance to be traversed, and the capacity desired led to the selection of a two-bucket jig-back, or reversible, tramway. This system comprises a suspended track composed of large wire ropes. Across this track two carriers travel simultaneously toward each other, from loading terminal to discharge point and vice versa. A single continuous haul or traction rope, operating through the reversible drive machinery, moves the carriers. With the elimination of intermediate supports, this system permits the handling of material at top efficiency.

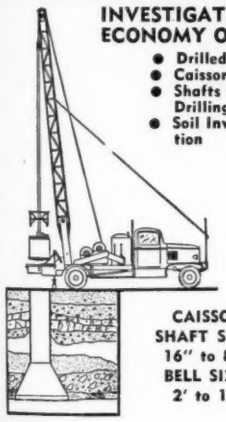
Equipment

For the track cable, 2-inch-diameter Leschen Hercules flattened-strand wire rope is used. The flattened strand was chosen because it provided a large proportion of metal wire to the total cross-sectional area, the strands being fitted together so as to offer maximum resistance to crushing and give a relatively smooth outside wearing surface. Heron chose a ⅝-inch mild plow-steel wire rope (also Leschen) for the traction cable. This rope had to pass over

(Continued on next page)

Photos Courtesy of Colorado School of Mines Magazine

Left: steel erection is started on the 75-foot tower at the Magnet Cove Barium Corp.'s plant site, north of Greybull, Wyo. Right: at a speed of 1,000 fpm a load of bentonite crosses the Big Horn River on the 1,600-foot aerial tramway. Heron Engineering Co., Denver, Colo., was the contractor.



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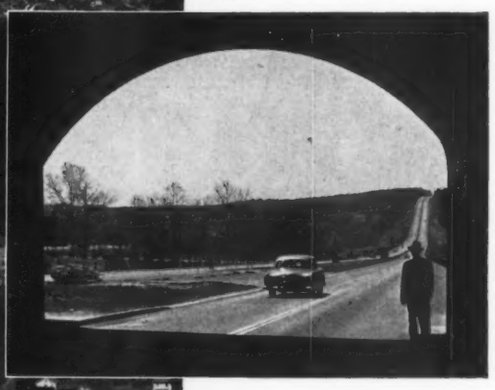
Write for Bulletin

PARKWAY TUNNELS HELP MOTORISTS ESCAPE NEW HAVEN TRAFFIC TANGLE

West Rock Tunnels are 1200-ft long, and each tube has two lanes. They are equipped with automatic ventilators, traffic control signals, and an elaborate lighting system that matches at all hours the day or night conditions outside the tunnel.

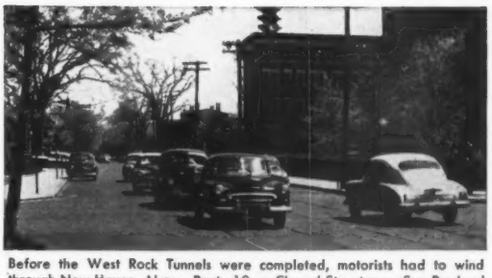


Wilbur Cross Parkway at south end of West Rock's twin-bore tunnel. Highway continues on north side of mountain. Two 24-foot concrete roadways are divided by a grassy median strip. Twelve traffic interchanges permit a free flow of traffic on and off the Parkway. Grade crossings have been eliminated by 19 overpass bridges and 19 underpass bridges.

Not long ago, a trip between New York City and New England inevitably included a bout with New Haven's heavy traffic.

Today, thanks to the West Rock Tunnels, drivers can avoid the New Haven bottleneck and enjoy the Wilbur Cross Parkway's full 29 miles. Named for a former governor, the Parkway rolls northeastward from the Housatonic River Bridge at Milford to the Berlin Turnpike at Meriden.

Estimated cost of the Wilbur Cross Parkway was $17,500,000. Bethlehem furnished steel for the highway, bridges and tunnels.



Before the West Rock Tunnels were completed, motorists had to wind through New Haven. Above, Route 10 on Chapel Street near San Raphael Hospital. During rush periods the Parkway saves an hour's driving time.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

STEEL FOR HIGHWAYS

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Dowel Units • Reinforcing Bars • Guard Rail
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Timber Bridge Hardware • Sheet- and H-Piling

Ore Crosses River By Aerial Tramway

(Continued from preceding page)

sheaves and through the drive machinery, so flexibility was important as well as strength and resistance to wear. All tramway equipment was designed and made by Heron Engineering Co.

Loading Terminal

The loading terminal includes the design of two 25-ton hoppers into which the trucks dump. Structural-steel hopper bottoms mount the segmental bin gates. All gates are controlled from the operating platform with air valves and large air cylinders. Bentonite, when wet, becomes extremely sticky, and every precaution was taken in the design of bins and gates to meet this problem. Bin and hopper walls are as nearly vertical as possible. The hoppers incorporated in the terminal serve both as a gravity feed for the tramway and a large storage capacity to regulate the flow of material from the trucking operation.

At the discharge point, movable trippers mounted on the track cables provide automatic dumping for the carriers. The movable feature permits dumping at any point along the line and makes possible a stockpile capacity of over 100,000 tons. A large stockpile at the plant site permits continuous plant operation even during winter periods when surface work is impossible.

Erection Methods

The erection of the steel tower was accomplished in record time with the aid of a P&H crane. Then the steel loading hoppers were placed in position in the terminal and field-welded to insure sturdy dust-tight bins.

The mounting of machinery in the drive terminal was relatively simple. All machinery was held in place by anchor bolts cast in the concrete supports. Terminal sheaves directing the traction cable into the drive sheave were mounted on structural-steel members fitted between the walls of the terminal structure.

The placing of the large track cables aroused great local interest. The 2-inch track cable arrived in a single length with sockets on either end. Over 1,700 feet in length, the cable on each reel weighed well over 6 tons. Two large tractors strung the cable along the line and made the precarious river crossing. A lead line of ½-inch Leschen wire rope was first pulled across the river by lighter lines and this in turn was used to pull the large track rope across. The P&H crane used in the erection of the tower went into action again to lift the track cable into position in the

(Concluded on next page col. 3)

NOW ONE MAN CAN DRILL "GREEN CONCRETE" OR GRANITE!

It's **EASY**, using a power hammer equipped with carbide-tipped *Thunder-Core* or *Thunder-twist*

Drills holes 1-1/8" to 6" diameter. Deep spiral flutes, one for each cutting tip, remove dust speedily and surely. Removable Thunder-Center makes it easy to precisely locate and start holes. Extra-length shanks and special tapers available on request. THUNDER-CORE does the cutting—the hammer does the work.

Drills holes 3/16" to 1-1/4" diameter, up to 24" deep. Spiral vanes, plus straight flutes, with no carbide hang-over at the tip of the bit. This eliminates packing of dust and binding of bit in "GREEN CONCRETE" DRILLING and increases drilling rate in VERY HARD CONCRETE or GRANITE. THUNDER-TWIST does the cutting—the hammer does the work.

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Big or small—CARVER makes them all, from 4,000 G.P.H. up, engine, belt or motor drive. Whatever your pumping problem, see your CARVER Distributor today. Ask him for Bulletin 110, or write Carver Pump Co., Muscatine, Iowa.

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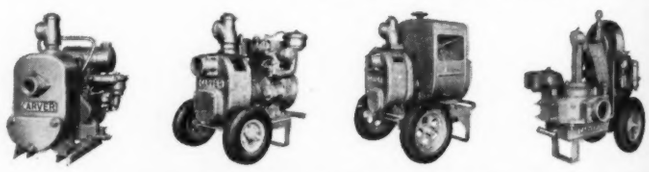

CARVER PUMP COMPANY, 1404 Hershey Ave., Muscatine, Iowa

CARVER — **CARVER PUMPS**

Torque Converters Permit Easy Shifting

Torque converters that simplify driving, permit shifting at wide-open throttle, and reduce operator fatigue are made by Allison Engine Division, General Motors Corp., Indianapolis, Ind. Torqmatic converters are available in 3 series for engines delivering approximately 75 to 350 horsepower.

Engine power is transmitted from the crankshaft through a series of flexible disks attached to the converter flywheel, thence to the converter pump. The converter pump hub drives the integral charging pump which circulates oil through the converter. The vanes of the converter pump project the oil into the turbine vanes at the outer circumference. This causes the turbine to turn in the same direction as the pump.

The oil leaves the turbine vanes at the turbine's inner circumference, but flowing in a direction opposite pump rotation. The stators redirect this flow so the oil, with its unexpended energy, enters the pump in the same direction as its rotation. This action aids the pump and is the key to torque multiplication.

As the torque multiplication ratio approaches 1 : 1, the angle of oil flow through the stators changes, causing the oil to strike the stators from their opposite sides. The first stator begins to freewheel on the ground sleeve in the direction of pump rotation and is soon followed by the second stator. The converter then functions as a fluid coupling.

Whenever additional load is applied to the output shaft, the converter automatically adjusts torque multiplication to the new load in the exact amount needed. Thus, unlike a step-gear transmission, where gear ratios are fixed, the Allison Torqmatic converter provides infinite ratios hydraulically, within the converter's range.

The company also points out that the Torqmatic converter multiplies torque hydraulically, holds the load to the power source at all times, and applies power to the load smoothly and firmly. It also protects against shock-load damage to equipment, eliminates gear-shift guess, and adjusts variation between engines in multiple installations.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 864.

Electronic Detector

A new portable electronic instrument for locating sources of trouble in all types of construction equipment has been announced by Anco Instrument Division, The American Name Plate & Mfg. Co., 4254 West Arthington St., Chicago 24, Ill. The Elec-Detec is said to locate friction noises in bearings, pistons, gears, ratchets, cams, and clutches.

The instrument uses a metal probe which serves as a microphone to locate the exact source of noise. Sound impulses are transmitted through an amplifier to headphones. The Elec-Detec helps to diagnose the trouble and determine where to make repairs. Sounds can be detected at low speed. Elec-Detec is furnished complete with batteries and leather carrying case.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 923.

Folder on Steel Scaffolding

A broadside illustrating the complete line of Waco steel scaffolding equipment has been published by Wilson-Albrecht Co., Inc., 3565 Wooddale Ave., Minneapolis 16, Minn.

The broadside is divided into three sections—maintenance scaffolding; sectional steel scaffolding; and allied equipment, including material-hoisting towers and elevators. It covers applications and specifications of each, together with special package units for specific jobs. It illustrates Waco rolling towers, scaffold jacks, various sizes of sectional scaffolding, mason's jacks, scaffold jacks, and carpenter's scaffolding.

This literature may be obtained from the company by requesting Form KP, or by using the Request Card at page 18. Circle No. 899.

Aerial Tramway

(Continued from preceding page)

tower saddles. Then the 5/8-inch traction rope was pulled into place in much the same manner as the 2-inch cables had been placed. With tension in the track cables provided through the hoist and anchorage reeving, the carriers were placed on the line and attached to the traction cables by wire-rope clips.

After proper alignment of drive machinery and sheaves, the tramway was ready for operation.

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The most popular wheelbarrow on the market for handling wet concrete. Ask your dealer or write direct to Lansing or one of our warehouses.

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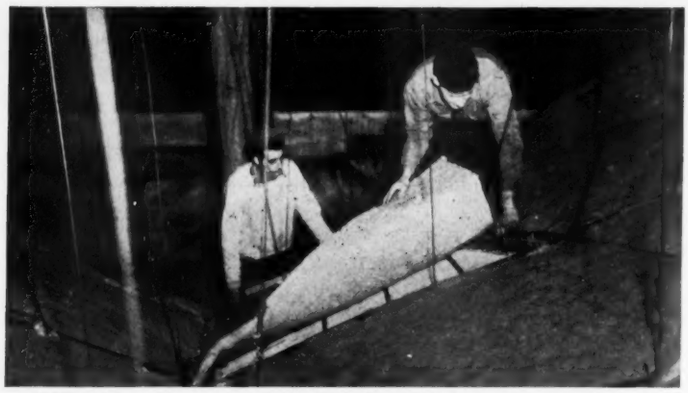

Workmen lay a piece of Ultralite in fire-gutted St. Alphonsus Church, Chicago, Ill. Note how the glass-fiber insulation fits between lath members.

Insulating Material Fireproofs a Church

Fire had gutted and destroyed 70 per cent of St. Alphonsus Church in Chicago, Ill. When the time came for reconstruction, the pastor with the help of L. J. Graf Construction Co., the general contractor, decided not only to fireproof the church, but also to get rid of its acoustical "ghosts". F. M. Norton Co., who did the insulation job, used Ultralite, a relatively new glass-fiber product.

Ultralite—manufactured by Gustin-Bacon Mfg. Co., Kansas City, Mo.—was selected for a number of reasons: first, since the rigging problem was so great, 1½-inch Ultralite in long blanket rolls would be easier to handle in mid-air than rockwool batts and other insulation types. Also, the architect, Herman Gaul, would not permit rockwool because of its paper backing—the fire was too recent to chance another. Then too, the material in 48-inch widths for the larger openings and 24-inch widths for the narrow sections and fill-in, would require a minimum of cutting once it had been taken "upstairs" (the main spire of the church is 210 feet high).

In order to work from topside down, the insulating material had to be hoisted 96 feet into the air. Using the steeple itself for anchor, workmen slung a rope and pulley on a cross beam, and within a few hours enough of the material was aloft to accomplish the job. Since there was no bulky weight, an ordinary painter's scaffold was used for the rigging. All told, the job took half as long as it would have done with older types of insulation.

Concrete Floor Patch

An improved method for repairing holes, ruts, and other imperfections in concrete floors of all kinds is announced by United Laboratories, Inc., 16801 Euclid Ave., Cleveland 12, Ohio. All that is needed is to clean and bond the surface to be patched, dump in the required material, and tamp firmly into place. The patched area may be placed in service almost instantly. The patch becomes smooth with moving traffic and will withstand extremely heavy loads, the company reports.

Superset Tampatch is composed of specially prepared aggregates coated with fast-drying synthetic resins and combined with asphaltic oils. The material is shipped in drums of various sizes, ready to use without mixing. When the container is kept airtight, the material will keep indefinitely and is ready for use at any time. The bonding material is delivered separately and is also available in various size containers.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 946.

Lincoln Electric's Exhibit

The Lincoln Electric Co., Cleveland, Ohio, featured several new developments in equipment and welding techniques in the company exhibit at the Metal Show in Philadelphia, Pa., in October. Featured were the new industrial models of ac welding machines in 300, 400, and 500-amp capacity. These units complete the Lincoln line of 60, 180, and 200-amp machines, and their design replaces previous 300 and 500-amp machines.

Also exhibited were: a flux for hard-surfacing with automatic hidden arc welding; the adaptation of Manual Lincolnweld equipment for semi-automatic hidden arc welding to a gasoline-engine driven welder; and the twin-arc process of hidden arc welding, a new technique of automatic welding which involves a simple method of feeding two electrodes in tandem to deposit metal into a single crater.

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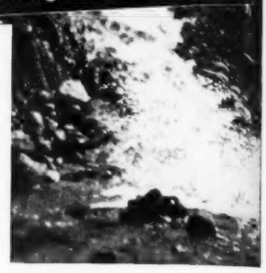
Dewatering 1500′ of 8′ x 14′ deep sewer trench at a river crossing, this 4″ Jaeger pump handled 40,000 gph at average speed of only 1200 rpm (10% to 15% lower speed than other pumps), and reprimed quickly, as needed, at 1400 rpm (compared with 1800 to 2000 rpm required to prime ordinary pumps). This is typical performance. Jaeger's larger shells and impellers, double priming action and use of largest engines applicable mean high efficiency, fuel economy, long life — in 1½″ to 10″ pumps.



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Convention Calendar

November 18-19—Building Research
Annual Conference, Building Research Advisory Board, National Academy of Sciences, Washington, D. C. Building Research Advisory Board, 2101 Constitution Ave., N. W., Washington 25, D. C.

December 9—Concrete Producers
Eighth Annual Convention, New York State Bituminous Concrete Producers Association, Hotel Statler, Buffalo, N. Y. Gus Rayner, Executive Secretary, Box 667, Albany, N. Y.

December 10-12—AASHO Convention
Annual Convention, American Association of State Highway Officials, Municipal Auditorium, Kansas City, Mo. Rex M. Whitton, Missouri State Highway Commission, Jefferson City, Mo.

December 11-12—Illinois Traffic Engineers
Fifth Annual Conference on Traffic Engineering, University of Illinois, Urbana, Ill. R. K. Newton, Supervisor, Engineering Extension, 713½ S. Wright St., Champaign, Ill.

January 7-9, 1953—Weed Control Conference
Northeastern Weed Control Conference, Hotel New Yorker, New York, N. Y. Dr. Walter C. Jacobs, Secretary-Treasurer, Vegetable Corps Department, Cornell University, Ithaca, N. Y.

January 13-15—National Constructors
Annual Meeting, National Constructors Association, Hotel Commodore, New York, N. Y. J. O'Donnell, President, 50 E. 41st St., New York, N. Y.

January 13-16—Highway Research Board
Annual Meeting, Highway Research Board, National Academy of Sciences, Washington, D. C. Fred Burggraf, Director, 2101 Constitution Ave., Washington 25, D. C.

January 14-16—Photogrammetry Convention
Annual Convention, American Society of Photogrammetry, Shoreham Hotel, Washington, D. C. Louis J. Reed, Meetings Chairman, 201 Wellington Road, Alexandria, Va.

January 26-27—Landscape Architects
Fifty-fourth Annual Meeting, American Society of Landscape Architects, Atlanta Biltmore Hotel, Atlanta, Ga. Bradford Williams, Corresponding Secretary, 9 Park St., Boston 8, Mass.

January 26-28—Asphalt Technologists
Annual Convention, Association of Asphalt Paving Technologists, Rice Hotel, Houston, Texas. Ward K. Parr, Secretary-Treasurer, Box 376, Ann Arbor, Mich.

January 26-28—Concrete Short Course
Quality Concrete Short Course, Georgia Institute of Technology, Atlanta, Ga. C. H. Taylor, Coordinator, Georgia Institute of Technology, Atlanta, Ga.

January 26-29—Heating and Ventilating
Fifty-ninth Annual Meeting, American Society of Heating and Ventilating Engineers, Conrad Hilton Hotel, Chicago, Ill. A. V. Hutchinson, Executive Secretary, 62 Worth St., New York, N. Y.

February 1-5—AED Convention
Thirty-fourth Annual Convention, Associated Equipment Distributors, Conrad Hilton Hotel, Chicago, Ill. P. D. Hermann, Executive Secretary, 30 E. Cedar St., Chicago 11, Ill.

February 2-4—Georgia Highway Conference
Georgia Highway Conference, Georgia Institute of Technology, Atlanta, Ga. C. H. Taylor, Coordinator, Georgia Institute of Technology, Atlanta, Ga.

February 9-11—ARBA Meeting
Annual Convention, American Road Builder's Association, Statler Hotel, Boston, Mass. Lt. Gen. Eugene Reybold, Executive Vice President, International Bldg., Washington 4, D. C.

February 17-19—Concrete Convention
Annual Convention, American Concrete Institute, Statler Hotel, Boston, Mass. William A. Maples, Acting Secretary-Treasurer, 18263 W. McNichols Road, Detroit 19, Mich.

February 23-26—National Sand & Gravel and National Ready Mixed Concrete Associations
Annual Conventions, National Sand & Gravel and National Ready Mixed Concrete Associations, Fairmont Hotel, San Francisco, Calif. V. P. Ahearn, Executive Secretary, 1325 E St., N. W., Washington 4, D. C.

February 24-26—Illinois Highway Engineers
Thirty-ninth Illinois Annual Conference on Highway Engineering, University of Illinois, Urbana, Ill. Wm. S. Pollard, Jr., University of Illinois, Department of Civil Engineering, Urbana, Ill.

February 26-28—Concrete Pipe Meeting
Forty-fifth Annual Convention, American Concrete Pipe Association, Baker Hotel, Dallas, Texas. Howard F. Peckworth, Managing Director, 228 N. LaSalle St., Chicago, Ill.

March 2-6—ASTM Meeting
Spring Meeting and Committee Week, American Society for Testing Materials, Hotel Statler, Detroit, Mich. Robert J. Painter, Executive Secretary, 1916 Race St., Philadelphia 3, Pa.

March 16-20—NACE Convention
Ninth Annual Conference, National Association of Corrosion Engineers, Hotel Sherman, Chicago, Ill. A. B. Campbell, Executive Secretary, 1061 M & M Bldg., Houston 2, Texas.

March 23-27—AGC Convention
Thirty-fourth Annual Convention, Associated General Contractors, Miami Auditorium, Miami, Fla. Charlson I. Mehl, Administrative Aide, Munsey Bldg., Washington 4, D. C.

Barrington Plant for Barco

A new plant is being constructed by Barco Mfg. Co., Chicago, Ill., manufacturer of portable gasoline hammers, drillers, and tampers. Located at 500-530 N. Hough St., Barrington, Ill., the building will provide 103,000 square feet of floor space for offices, manufacturing, and other facilities. It will be ready for occupancy sometime early in 1953.

FOR LONG, DEPENDABLE PERFORMANCE

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MODEL NO. 1 — ILLUSTRATED

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- Stainless steel piston
- Swivel ring (permits operation from any position)
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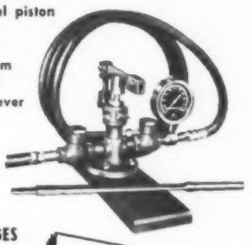

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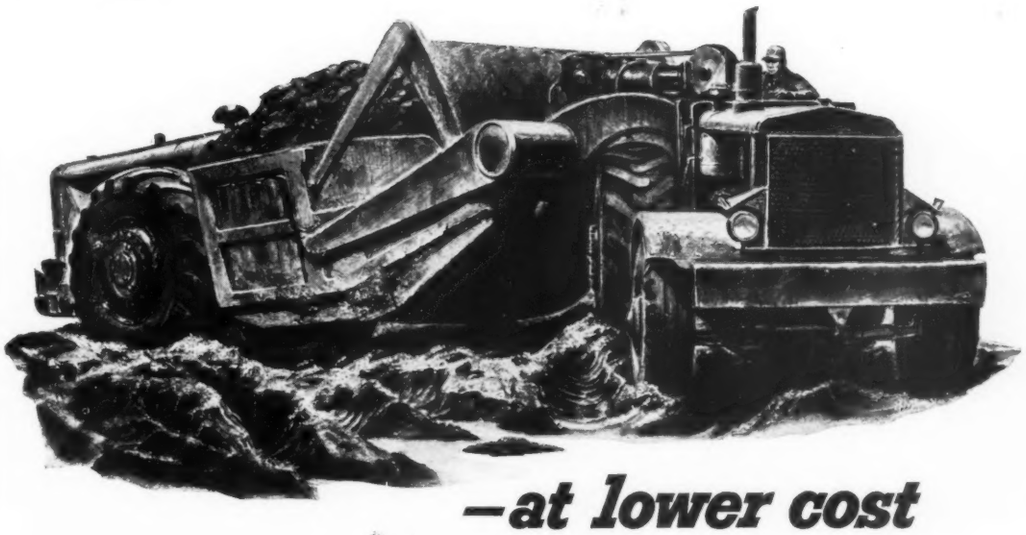

—at lower cost

BIG earth-moving vehicles like this twin-engine self-loading scraper get more work done faster because of Allison TORQMATIC DRIVES. These time-proved hydraulic drives — more than 10,000 have been built for Army tanks and heavy-duty vehicles—make multiple engine applications possible —and practical.

TORQMATIC DRIVE provides a smooth, steady, oil-cushioned flow of power—high-starting torque with uninterrupted acceleration —protection against shock-load damage to engines and equipment. It eliminates engine lugging and stalling while maintaining power to drive wheels at all times. This permits the engine to operate in its most effective speed range by balancing engine power with load requirements.

Users of trucks, scrapers and other vehicles equipped with TORQMATIC DRIVE *report up to 30% more work done and 15% less cost per yard than with a mechanical drive* — additional good reasons why engineers are designing Allison TORQMATIC DRIVES into all types of heavy-duty equipment.

Allison TORQMATIC DRIVES are the only heavy-duty full torque-shifting vehicle transmissions available today—engineered for compactness, permitting flexibility of drive-train design for today's and tomorrow's vehicles.

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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

State Liable for Interest Where Payment Was Delayed

THE PROBLEM: *A state contractor's work was completed and accepted and the State admittedly owed the contractor a definitely ascertained or ascertainable sum. But payment was withheld because the contractor refused to execute a virtual release of a claim for alleged additional work. In a suit to collect the contract price plus payment for the extra work, it was decided that the supposed additional work was part of the contract job and that the contractor was entitled to the contract price only. Was the contractor entitled to interest from the time payment was due?*

THE ANSWER: Yes. But, by unnecessarily conceding that interest did not run for two months, pending preparation of the final estimate, the contractor waived interest for that period. (Rusciano & Son Corp. v. State of New York, 110 N. Y. Supp. 2d 770, decided by the New York Court of Claims.)

The court cited an observation by the Appellate Division of the New York Supreme Court that it would be unfair to deprive a contractor of the interest on moneys due him upon the performance of his contract merely because he was pressing for or intended to press a claim of damages sustained as an incident to his full performance.

The Court of Claims refers at some length to a practice in New York in such cases of severing the undisputed debt of the State from the contractor's claim for extra allowance or damages. Apparently the purpose of the severance practice is to avoid the effect of the final payment clause which the State of New York now writes into its contracts for the construction of public works, so as to enable the contractor to collect his debt and to relieve the State from continuing to pay interest thereon while litigation is pending. The court said that the State was not thereby relieved from paying interest from the date when the State's debt accrued, and that therefore it was not necessary to sever the claims in court. As for the release clause itself, it served no useful purpose except perhaps to foreclose an unwary or an ill-advised contractor from recovering damages or for extra work performed which might have merit. If the clause were insisted upon, a simpler method should be adopted of abrogating its effect and of releasing the sums earned to a contractor who had satisfactorily completed the work he had undertaken to perform, although he might then be demanding that additional amounts were his due. This simple method would be in the interest of an expeditious and efficacious administration of justice.

U. S. Labor Law Unapplicable

THE PROBLEM: *On the Alcan Highway project in Canada, were employees of American contractors engaged in constructing buildings and flight strips preliminary to road construction entitled to the overtime benefits of the Federal labor laws?*

THE ANSWER: No. (Byrne v. Metcalfe Construction Co., 99 Fed. Supp. 635, decided by the United States District Court, District of Nebraska.)

The court reasoned: The contractors turned the buildings, etc., over to the Army Corps of Engineers and had nothing to do with the road construction. The employees were not "engaged in commerce" within the meaning of the Federal Fair Labor Standards Act. Furthermore, because all the work in question was done outside the territorial limits of the United States, the Act was not applicable.

Owner Could Not Claim There Was an Overpayment

THE PROBLEM: *A contract to excavate and haul levee material on a cubic-yard basis specified that measurement for payment should be by cross-sections, as computed by the engineers for "monthly payment estimates", on the basis of borrow excavation less unsuitable material. Unsuitable material was to be paid for on the basis of cross-sections in the bank. The contract also specified that the owner, ten days after the end of each estimate period, would pay the contractor for "actual borrow excavation and hauling" during the estimate period. The owner made monthly payments on statements called "progress estimates", based on the number of truckloads of material moved. Claiming that there had been an overpayment, the owner sued to recover the excess, on the theory that the monthly payments were based on mere estimates. But there was no provision in the contract for such readjustment. Was the owner's suit properly dismissed?*

THE ANSWER: Yes. (Buck & Donahue, Inc., v. Parini, 77 Penna. Dist. & County Reports, 422, decided by the Court of Common Pleas for Lycoming County, Pa.)

The court reasoned that if the owner

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saw fit to disregard the manner of measuring the amount excavated for payment as set forth in the written agreement, and proceeded to use another method, and paid the contractor on that basis, it did so at its own risk, and so could not sue for the overpayment. The contractor had a right to assume that the the monthly payments represented actual borrow excavation, especially since each statement recited that it covered "borrow excavation".

The decision in this case, being one of a mere trial court, is subject to reversal on appeal to one of Pennsylvania's two appellate courts. It is nevertheless noteworthy because of the judge's reasoning and the persuasive effect it might have upon the minds of judges of any appellate court.

Bankrupt Contractors: Priorities of Claims

THE PROBLEMS: *A subcontractor under three contracts defaulted and his surety either completed the job or arranged with the prime contractor to complete it. (1) As to projects completed by the prime contractor—was the surety entitled to require him to apply all contract balances remaining in his hands, both earned and unearned, toward the cost of completion before the surety became liable on its performance bonds, thereby leaving nothing to pass to the subcontractor's trustee in bankruptcy? (2) As to a subcontract completed by the surety—did the surety have an equitable lien, superior to the claim of the trustee in bankruptcy, on all contract balances, earned and unearned, to reimburse him for the cost of completing the job and for labor and material claims and penalties paid? (3) Did the surety's rights attach as of the date of the surety bonds—more than four months before the bankruptcy proceedings were started—thereby giving priority over other creditors?*

THE ANSWERS: (1, 2, 3) Yes. (Danais v. M. De Matteo Construction Co., 102 Fed. Supp. 874, decided by the United States District Court, New Hampshire.)

Concrete-Mix Inspection

THE PROBLEM: *A construction contract called for inspecting concrete ingredients and testing concrete at the contractor's expense. Had the work been done at the site the Government would have used its own inspectors. But for the contractor's convenience the materials were dry-mixed at a railroad siding 2 miles from the construction site. Could the contractor be charged with the cost of inspection there?*

THE ANSWER: Yes. (Continental Illinois National Bank & Trust Co. v. United States, 101 Fed. Supp. 755, decided by the United States Court of Claims.)

The court thought that the Government should not be put to the expense of inspection at a distant batching plant, because its inspector would be idled while not inspecting there; at the site he could be otherwise useful to the Government.

Son Hurt on Father's Job

THE PROBLEM: *A subcontractor on a highway job employed his 20-year-old son, who was injured through negligence chargeable to the father. The son was married and living apart from the father. Was the latter liable?*

THE ANSWER: Yes. (Lancaster v. Lancaster, 57 So. 2d 302, decided by the Mississippi Supreme Court.)

The son having been "emancipated" from the father, the case did not come within the general rule that a minor cannot sue his father for negligent injury.

Enjoins Secondary Boycott

THE PROBLEM: *A public building contractor and his subcontractors employed union labor and had no labor dispute. A grading subcontractor sublet haulage of gravel to plaintiff, whose truck drivers were nonunionists. Unionists picketed the construction site in an effort to coerce plaintiff into using union drivers, through the influence of the general contractor and his subcontractors. Was plaintiff entitled to an injunction against such picketing and bannering?*

THE ANSWER: Yes. (W. E. Anderson Sons Co. v. Local Union No. 311, 104 N. E. 2d 22, decided by the Ohio Supreme Court.)

After the prime contractor's and subcontractors' men walked off the construction job during plaintiff's haulage of gravel, plaintiff sued to enjoin this picketing at the site to which the materials were delivered. An intermediate appellate court refused to issue an injunction, but, on further appeal, the Supreme Court decided that this secondary boycott was illegal and should be enjoined. Here is the gist of that court's conclusions:

Where no unlawful object is involved, workers may use pickets and banners to dissuade prospective employees and patrons from dealing with an employer against whom they have a grievance.

A boycott is "secondary" when there is an exercise of economic pressure upon outsiders to cause them, through fear of loss or damage to themselves, to refrain from dealing with the employer against whom the boycott is directed.

Picketing or bannering falls within the constitutional guarantee of right to

(Concluded on next page)

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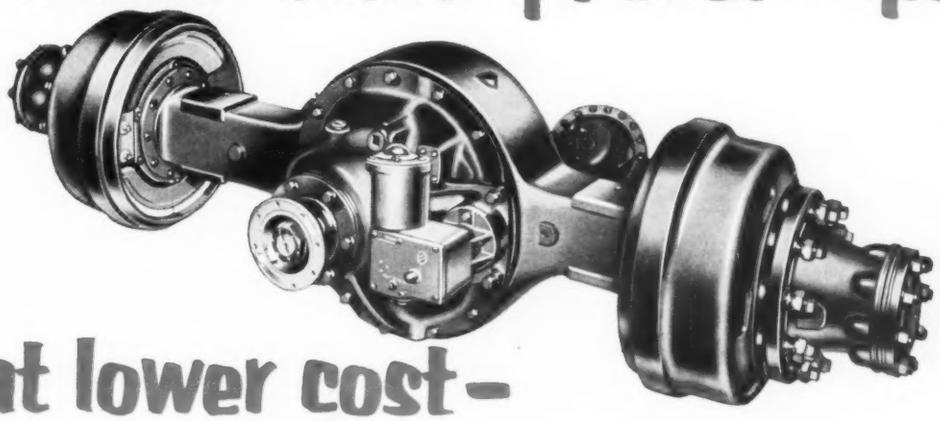

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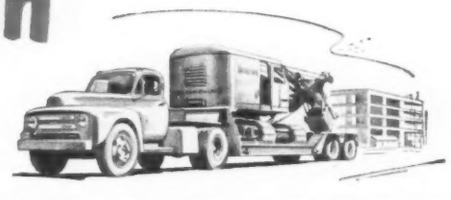

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Avoid Legal Pitfalls

(Continued from preceding page)

free speech only so long as lawfully conducted; the guarantee does not extend to use of unlawful means to injure another in his property rights.

The Ohio court cited a decision of the United States Supreme Court in a case where Associate Justice Frankfurter said in effect that picketing is not an "inevitable legal equivalent" to the right of free speech. In that case (339 U. S. 460) the Supreme Court declared to be illegal the picketing of a store in order to coerce the owner into using a number of Negro employees proportioned to Negro patronage.

The Ohio court said that the reasons for distinguishing between primary and secondary boycotts, for the purpose of injunction, lie in the fact that they constitute an unlawful interference with the rights of innocent third parties and of the public generally, and in the point that one not a party to industrial strife may not be forced to become an ally of either party to a labor dispute to help destroy the other.

The same decision was reached by the Texas Court of Civil Appeals, Dallas, in the case of Dallas County Construction Employers Assn. v. General Drivers, etc., Union—title of case reversed on appeal—246 S. W. 2d 677. In that case plaintiffs, contractors, and subcontractors on construction jobs, used ready-mixed concrete furnished by two companies and moved from the place of production to the job sites by a concrete-haulage company. The only labor dispute existed between that company and its employees, who not only picketed the company's premises but also the truck mixers as they proceeded to and reached the places where the mix was delivered. A sign read: ". . . Please Do Not Use This Concrete. We are picketing only this truck." At some of plaintiffs' jobs their employees refused work with the concrete so delivered, thereby causing temporary work stoppage.

In that case a temporary injunction was granted against this secondary boycott by the strikers, pending a hearing on plaintiffs' application for a permanent injunction. The court stressed the facts that the plaintiffs were innocent third parties having no dispute with the union, and declared that if on final hearing of the case the proof should be the same as presented on the application for a temporary injunction, plaintiffs would be entitled to a permanent injunction.

Government Was Bound By an Official Ruling

THE PROBLEM: *A Federal reclamation construction contract provided a per diem penalty for delayed performance unless the contracting officer should find that the delay was due to unforeseeable cause without fault or negligence of the contractor. The officer found that 119 days of the delay were excusable and 86 days inexcusable. Settlement was made on that basis. More than a year later the General Accounting Office purported to modify the contracting officer's finding and impose 87 more days' penalty. The additional amount involved was withheld from payment due under a related contract. Was the contractor entitled to enforce payment of the amount so withheld?*

THE ANSWER: Yes. (Long v. United States, 102 Fed. Supp. 134, decided by the United States District Court, District of Montana.)

The court said that the contracting officer's findings were supported by evidence and that, for lack of any showing that he violated any contract or administrative provisions or acted in bad faith, his determination bound both the Government and the contractor.

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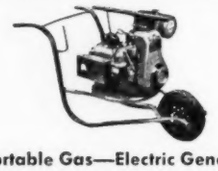

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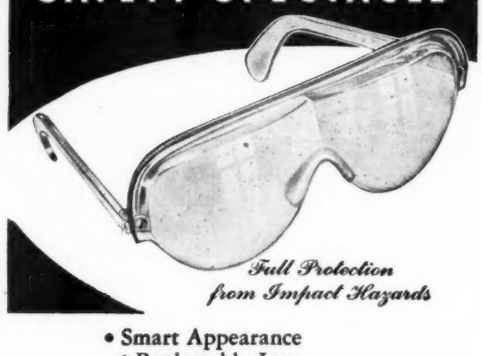

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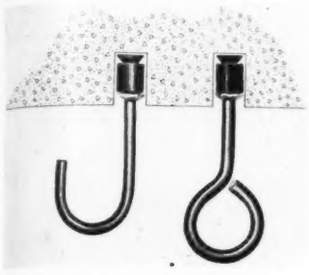
Anchoring Assemblies

New pipe and eye-bolt anchoring assemblies have been developed by Super-Grip Anchor Bolt Co., Inc., 3333 N. 22nd St., Philadelphia 40, Pa. The pipe-bolt assembly is used for mounting conduit, gas and water pipe, etc., to masonry. The eye-bolt assembly is used for anchoring guy wires to masonry.



The Super-Grip assemblies consist of the pipe or eye bolt, lead sleeve, and patented cup-shaped steel anchor. After insertion of the assembly in masonry, the lead sleeve is mushroomed out by repeated blows on a special tamping tool. Continuing blows flatten out the steel anchor, driving its ribbed steel edges into the walls of the hole. According to the company, the steel anchor reinforces the lead sleeve and provides a permanent solid anchorage that keeps pipe or eye bolts from loosening.

The pipe-bolt assembly replaces pipe straps, anchors, screws, and bolts. They are rustproof and can be obtained for ½, ¾, or 1-inch pipe. Eye-bolt assemblies are also rustproof and are available in bolt lengths to 6 inches with a hole diameter of ½ inch.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 895.

N. J. Turnpike Authority Seeks Further Bond Issue

An additional $20,000,000 in bonds is needed for the New Jersey Turnpike, and the Authority has asked its bondholders to approve an amendment of the bond resolution to provide for such an issue.

The proposed amendment has a twofold purpose: to provide additional facilities for the present Turnpike, and to allow of further extensions and enlargements. As regards the needs of the present pike, the following improvements are contemplated: additional toll-collection facilities (with increased staff) and improved access lanes; additional and enlarged service areas; more shoulder work; lighting and other safety devices; additional maintenance facilities with adequate staff and equipment; certain revisions in design and specifications, with attendant labor and material costs; and final settlement of construction contracts and amounts to be paid for real estate for right-of-way purposes. Future plans include: construction of two more traffic lanes between Interchange 4 (Camden-Philadelphia) and Interchange 11 (Woodbridge - North Jersey shore points), and between Interchange 16 (Lincoln Tunnel) and Interchange 18 (George Washington Bridge). This will be subject to certification by the consulting and traffic engineers that such construction will increase the net operating revenues of the Authority or is necessary for the safe and efficient operation of the Turnpike.

Catalog on Scraper

An 8-page catalog covering its 15.5-cubic-yard scraper has been released by The Euclid Road Machinery Co., 1361 Chardon Road, Cleveland 17, Ohio. It describes and illustrates major design features and provides detailed specification data.

The Model TDT scraper hauls loads of 21 cubic yards heaped at a 1 to 1 slope and 18 cubic yards at a 3 to 1 slope. It has a 275-hp engine, 10-speed transmission, 24:00 x 25 tires, and independently actuated hydraulic controls. Top speed loaded is 28.2 mph.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 889.

Davey Appointments

George E. Jennings is the new West Coast District Manager for Davey Compressor Co., Kent, Ohio. Mr. Jennings, who was formerly Purchasing Agent for the U. S. Navy Yards and Docks Supply Office at Port Hueneme, Calif., will make his headquarters in San Francisco. He will be in charge of operations for Davey in California; Oregon; Washington; the cities of Reno and Carson City in Nevada; Yukon Territory, Alaska; and the Province of British Columbia, Canada.

The new West Central District Manager is N. C. Hays. He will be in charge of company operations in New Mexico; Arizona; Utah; Colorado; Wyoming; Idaho; Montana; the Las Vegas, Nevada, trading area; and the provinces of Saskatchewan and Alberta, Canada. Mr. Hays was formerly Sales Representative for H. H. Nielson Co., Salt Lake City, Utah, distributor of Davey compressors.

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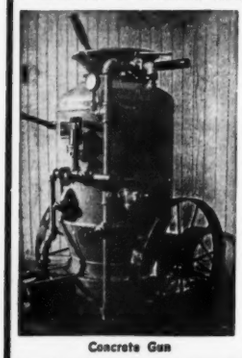
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A Smith mechanical spreader places bulk cement on the ground. Ben Hawkins, Lake Village, Ark., was the contractor for the soil-cement job at Crossett, Ark.

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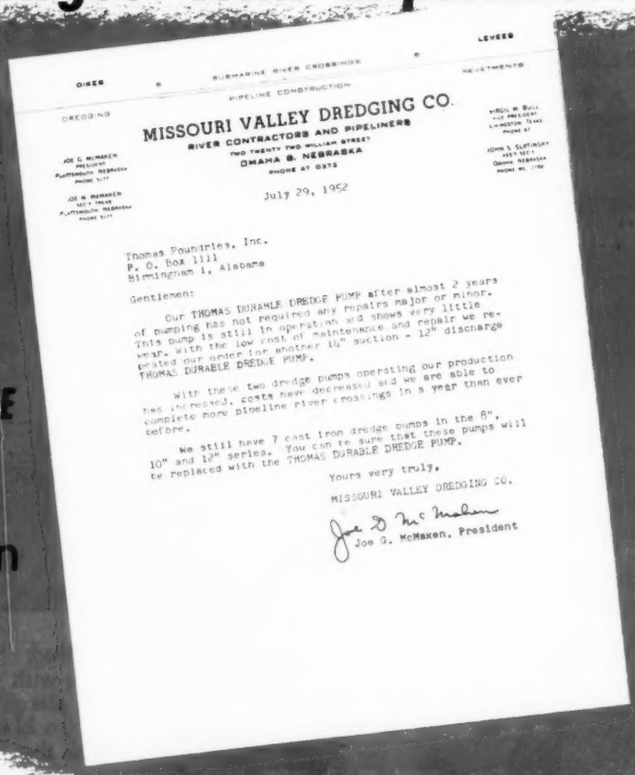

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Thomas Pump used in dredge work on Missouri River.

Thomas Pump used on Arkansas River pipe line crossing.

Soil-Cement Base Converts Dirt Roads

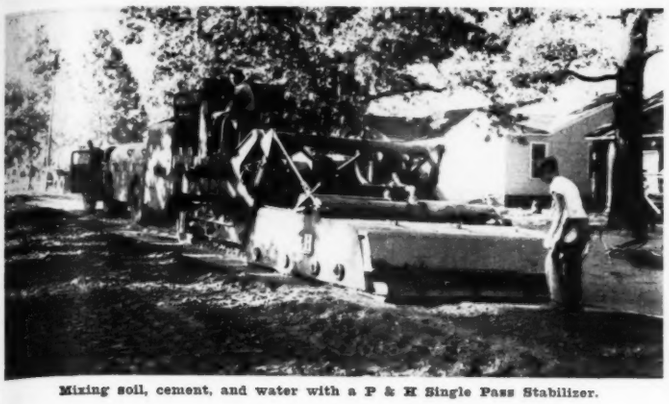
A lumber town nestling in the southeastern corner of Arkansas, in the heart of the tall-pine country, was plagued with dusty, rutted streets. Crossett's city fathers had long been conscious of the objectionable dirt, and this year they decided to do something about it. Bids were taken, and a 6-inch soil-cement base course was decided on.

Today the city is converting its dust into hard-surface pavement by combining it with portland cement. The experimental 70 blocks of street paving—a sizable bite in a town of 5,000 people—proved so successful that an additional 35 blocks has now been awarded. On the first job, Ben Hawkins, Lake Village, Ark., was the contractor, with Delta Paving Co., Jackson, Miss., subbing the paving. Delta was represented on the job by Gregory Root, Superintendent, and Woodrow Harris, Foreman. K. W. Lefever, Little Rock, Ark., was Consulting Engineer and G. S. Davis was in charge of the job. Testing was done by Barrow-Agee Testing Laboratory, Shreveport, La. Ben Hawkins has again been awarded the contract on the new 35-block project.

There were several unique obstacles for the soil-cement builders to overcome, outstanding of which was a subgrade problem. Old tree stumps and roots had not been wholly removed during the construction of the original street and after their uprooting the affected subgrade areas had to be removed, aerated, and recompacted to a stable foundation. Another problem was the appearance of unstable areas after completion of the base course and before placement of the bituminous surface. These areas were excavated to firm subsoil, filled with satisfactory soil, and compacted to a high density before the addition of a new soil-cement base course.

Manhole frames and top layers of brick in the manholes were removed to a depth of 12 inches below the proposed pavement surface. This permitted placing of planks over the holes to allow processing over the area, after which the planks were removed and the frames replaced. In some cases, plastic soil-cement was used around the manhole frames instead of the usual compacted mixture. Soil along the edge of the pavement was mixed with cement (seven parts soil to one of cement) with enough water added to produce a plaster-mortar consistency. This required little compaction of the mixture during placement and the only surface finishing tool needed was a hand shovel to mold the surface to smoothness and grade.

The actual soil-cement processing of the streets consisted of spreading bulk cement on the grade with a Smith



Mixing soil, cement, and water with a P & H Single Pass Stabilizer.

mechanical cement spreader, mixing the soil, cement, and water with a P & H Single Pass Stabilizer, compacting the moist mixture with a sheepsfoot roller, and finishing with a pneumatic-tire roller supplemented by a Caterpillar motor grader to produce the proper crown and grade. As soon as the rolling was completed, the surface of the soil-cement base course was moistened thoroughly and a bituminous cover of about 0.2 gallon per square yard applied. A ¾-inch bituminous surface course was placed on the base course later.

The popular demand for soil-cement pavement in the town may be partly attributable to an 8-mile soil-cement job near Crossett on Arkansas Highway 133. After five years of logging truck traffic, this section has required little maintenance. Crossett looks for the same service from her new streets.

Textbook on Highway Curves

A fourth edition of "Highway Curves" by the late Howard Chapin Ives, C.E., has been brought out by Philip Kissam, C.E., Professor of Civil Engineering at Princeton University. First published some 20 years ago, the aim of the book is to present the theory and practice of highway curves as followed in the United States. The fourth edition has involved rewriting the entire text. Covering highway surveying, location, geometric design, and earthwork, it presents methods designed to simplify both the field operations and the mathematical solutions. Duplicate methods have been avoided, but those chosen have been given a rigorous and complete treatment. The text is plentifully illustrated with diagrams, and the whole of the second part of the book is given over to tables. Many state highway departments have contributed plans, specifications, and suggestions.

"Highway Curves" is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York, N. Y. The price is $7.00.

A Truck Attachment For Drum Handling

A new automatic attachment for drum and barrel handling with gasoline and electric fork trucks is available from The Yale & Towne Mfg. Co., Philadelphia Division, Roosevelt Blvd. at Haldemann, Philadelphia 15, Pa.

The Marvel Lift-o-Matic is said to handle any drum regardless of bead or rim size. It can be attached to any Yale fork truck in a few minutes by the operator. No additional controls are required, since pickup and release are effected through raising and lowering of the truck lift cylinder.

Drums can be tiered or removed at maximum fork height without the use of pallets. Because there are no side clamps or projections, drums can be picked up and spotted in close positions for maximum utilization of storage space. More than one attachment can be mounted on a truck for the multiple handling of drums.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 900.

Concrete-Pipe Short Course

The American Concrete Pipe Association will hold its Second Annual Short Course School of Instruction on November 20, 21, and 22. Classes, for representatives of member companies of the Association, will take place at the Sherman Hotel, Chicago, Ill., under the supervision of John G. Hendrickson, Research Engineer of the Association.

Subjects covered will include: ASTM specifications; concrete pipe in sewer and in culvert construction; and selling and promotion of concrete pipe. The course will end with a panel discussion on manufacturing problems.

Cleco's Detroit Office

A new sales office and warehouse has been opened by the Cleco Division of Reed Roller Bit Co., Houston, Texas, manufacturer of portable air tools. Located at 18071 Wyoming Ave., Detroit 21, Mich., the unit has complete facilities for servicing Cleco air tools in this area. B. O. Stoothoff is Division Manager.

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New home of the Chrysler Industrial Engine Division at Trenton, Michigan. This new plant, with more than a million square feet of floor space, gives the Chrysler Industrial Engine Division tremendously increased production, testing, research and developmental facilities. These greater facilities were made necessary by the substantial increase in applications of Chrysler Industrial Power and will better enable the Division to keep pace with [illegible]

CHRYSLER Industrial Engines

HORSEPOWER WITH A PEDIGREE

New Road to Develop A Remote Barrier Reef

A 56-Mile Strip of Sand-Asphalt Road-Mix Brings Highway To North Carolina Outer Banks; Ballenger Has Contracts

By WILLIAM H. QUIRK
Editor

• ONE of the last isolated regions in North Carolina, or the entire east for that matter, is about to lose its singular and remote character through the construction of a 56-mile hard-surface road along the picturesque Outer Banks, 30 miles off the mainland across Pamlico Sound. The North Carolina State Highway Commission is laying a sand-asphalt mixed-in-place pavement on this barrier reef. The project starts at Nags Head on Bodie Island where U. S. 158, 64, and 264 have their origin at the edge of the Atlantic. From that intersection the new road continues down the coastal strip for 8.41 miles. Jumping the mile-wide gap of Oregon Inlet, crossed by a toll-free ferry, the road picks up again on the south side and continues for 47.5 miles to Hatteras Village.

Work on the long project began in 1947 when the Highway Commission awarded the initial contract to the Ballenger Paving Co. of Greenville, S. C., on its low bid of $319,040 for a 17.32-mile section at the south end. The first job started at Hatteras and extended north to Avon. Ballenger being first on the job, plus its experience and know-how, no doubt helped in obtaining the three remaining contracts for the firm. From Avon, the second contract reached north 17.80 miles to a point beyond Rodanthe. Bid price for this section was $204,722. Continuing northward, the next contract for $191,838 covered 12.34 miles to the south side of Oregon Inlet. The 8.41-mile stretch on the north side of the inlet, adjoining the existing pavement just south of Nags Head, went for $94,218.

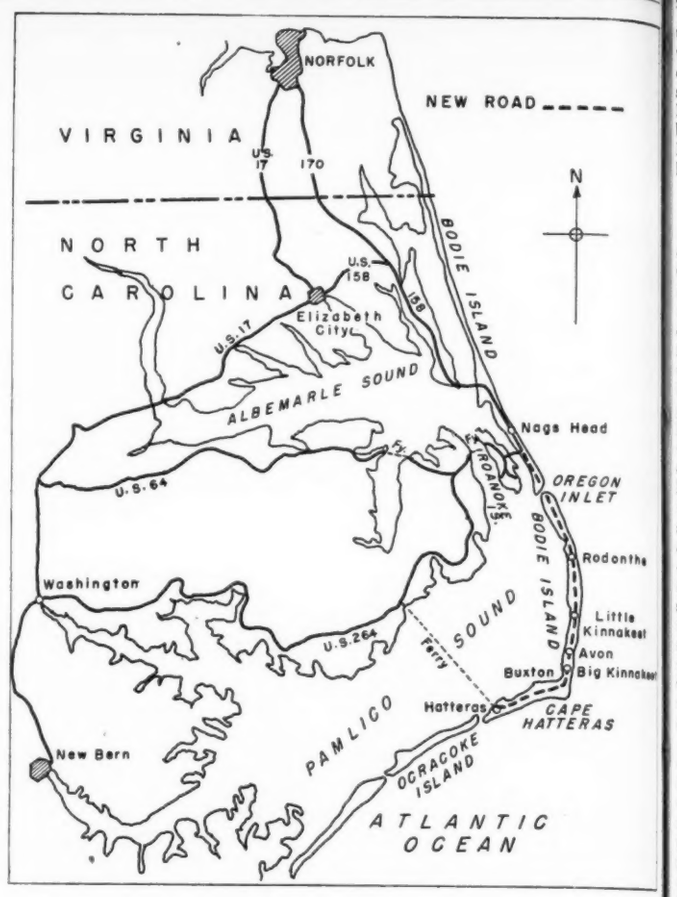
Estimated cost of the total 56 miles is $809,818. A 2¼-mile piece of road is also scheduled to be built from Buxton, about mid-way in the southerly contract, out to the extreme tip of Cape Hatteras—Graveyard of the Atlantic—where North Carolina has developed a 12,000-acre state park.

To Finish This Year

Constructed of native sand and RC-2 asphalt, the 18-foot pavement consists of a 5-inch uniform compacted surface course with a 2-inch center crown. In cuts it is flanked by 8-foot shoulders and in fills by 6-foot shoulders, pitched at the rate of ¾ inch to the foot. Cut and fill slopes are 3 to 1. The State acquired a 100-foot right-of-way for the construction except through the tiny fishing villages, where only 60 feet was taken.

In accordance with the provisions of the state bond issue, the necessary land for the highway was obtained practically without cost. Voters of North Carolina agreed to provide a right-of-way if the Highway Commission built a road. There is no Federal aid despite the fact that the Federal government is one of the main users of the road and will benefit considerably from the hard pavement. The new road serves both Bodie and Hatteras lighthouses, Coast Guard stations Chicamacomico, Little Kimmakeet, Oregon Inlet, and Cape Hatteras; a migratory waterfowl refuge; and a weather station—all agencies of the Federal government.

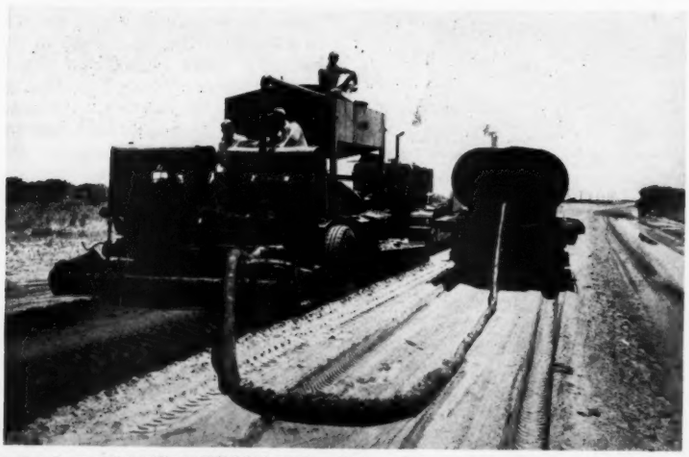
While the southerly initial section was finished in 1948, there was a lull in the road building until 1950, when the second contract got under way. The third contract for the section north of the inlet began in 1951, and the final stretch just south of the inlet started



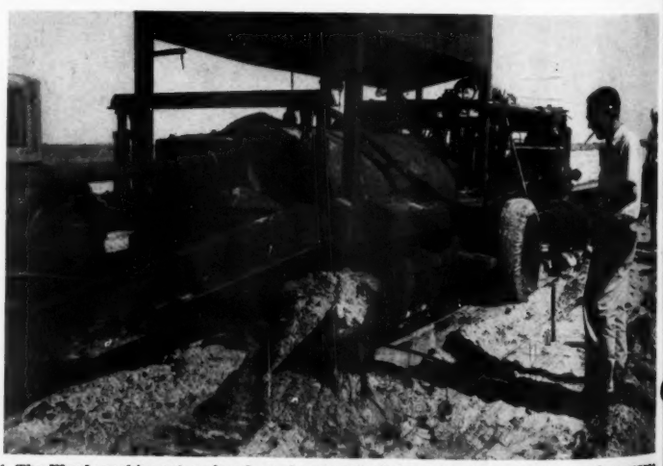
C. & E. M. Photos

1. From the LCM, RC-2 asphalt is pumped to a supply truck—south side of Oregon Inlet.

2. Supply truck (rear) hauls the asphalt to a Wood Roadmixer pulled by a D8 tractor.



3. Truck runs alongside as RC-2 is transferred through hose to storage tank on Roadmixer.



4. The Wood machine mixes beach sand and asphalt for a 5-inch compacted surface course.

this year. Of the 56 miles about half was completely finished by the middle of 1952. On the remaining 28 miles, the sand-bituminous surface was practically all mixed at that time, but had not been cured or brought to finished grade. By the end of the year the contractor hopes to finish the entire paving.

Geography and Topography

Climate on the Outer Banks differs considerably from that of the North Carolina mainland. The Gulf Stream flows northeast through the Atlantic only 12 miles off Cape Hatteras, the closest to shore north of southern Florida. Semitropical vegetation is common to this long barrier reef, and orange, lemon, grapefruit, and fig trees are grown successfully at the lower end. In general the weather is 10 degrees warmer in the winter and 10 degrees cooler in the summer than on the mainland. This climatic factor gave the contractor about a month more in the spring and fall for mixing the sand-asphalt than would have been possible on the mainland. But the year-round mild climate did not produce the hot scorching days in summer that are necessary for curing out the mix and shaping and finishing the surface. As a result, this finishing period on the Outer Banks is about 60 days shorter than it is across the Sound on the mainland.

Topography affected the design of the road bed. In areas where the sand dunes along the ocean are high, the road was built on a shallow embankment a foot or two above natural ground. In such stretches, the dunes protect the highway from the pounding of the surf, particularly from the winter northeasters or the great flood tides of the spring and fall. Where the dunes are too low to afford protection, or there are gaps between that would let the ocean through, the road flattens out so that it no longer looks like a road but just a ribbon of black laid across the sand.

Thus the water may rush across the pavement yet do no appreciable damage. In a few places where the water did get past the dune barrier, it tore away and eroded the embankment, undermined the surface, and broke up the pavement. No one can foresee just where the ocean may break through the dunes, which are ever shifting both in position and size. Or the water may come from the Sound on the other side when a southwest wind is blowing. The banks average only ½ mile in width and the road runs approximately along the middle.

Ride With the Punch

Where washouts occurred, the engineers lowered the grade about a foot, salvaging the broken-up sand-asphalt for use on the slopes. From the edge of the new pavement, a mix continues out on a 10 to 1 slope for 10 to 15 feet until natural ground is reached. Then a 10-foot berm is added, making a total paving strip about 50 feet wide. This streamlined cross section merging with the terrain is designed to let the water pass over it, rather than to withstand any direct onslaught in which the pavement could emerge only second best.

A soil-cement base was laid in some of these washed-out portions to compare its resistance with that of sand-asphalt. Despite the hazards of wind and water, only 2,800 feet of pavement had to be entirely replaced. The damage occurred in three different locations—1,200, 1,000, and 600 feet in length.

This low flat section is also used across an area which once had been an inlet from the ocean into Pamlico Sound. The State Highway Commission had built a trestle over the water after the 1933 hurricane opened a gap in the banks, but nature soon after completely filled up the inlet with sand, leaving the bridge high and dry over the shoaled section.

C. & E. M. Photo

One of three locations where the force of mighty waters undermined the new surface. Lowering the grade so that the pavement merged with the terrain was the engineers' answer to this problem.

Pro and Con

The sand-bituminous surface course has its advantages and disadvantages. With the use of local sand there is no aggregate problem which could be a costly one in transporting material to this isolated region. But the beach sand is too smooth, round, and fine to be a good aggregate, and the asphalt does

(Continued on next page)

THE T6 TRAXCAVATOR® SHOVEL—

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Paul N. Greene Co's. T6 is here shown at work in Fort Wayne, removing old concrete and brick paving, crossties and other debris. The powerful lift and drawbar push tears up the old surfacing and puts a heaped 1½ yds. in the bucket each pass.

TRAXCAVATOR Shovel's ability to dig, load, bulldoze, lift, ditch, backfill and spread leads Paul N. Greene, Fort Wayne, Indiana, to say, "That T6 is the most complete tool ever owned."

And this veteran of 25 years of construction work knows what he's talking about. His T6 TRAXCAVATOR Shovel has served him on a variety of tough tasks. It has worked in nearly every material—sand, clay, rocky soil, frozen ground, debris, broken concrete—and it's done almost every job in the books.

There's no one machine on the market today that can do as many jobs as a TRAXCAVATOR Shovel...and only one man is required to operate it. Be prepared to meet any task on your next contract. See your "Caterpillar" Dealer today about delivery of the TRAXCAVATOR Shovel that meets your needs...or write direct.

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New Road to Develop A Remote Barrier Reef

(Continued from preceding page)

not easily adhere to its ball-bearing-like surface. The mix contains 4.4 per cent of RC-2 asphalt, or at the rate of 3½-gallons per square yard of 5-inch compacted pavement. Experiments were made with greater percentages of bitumen, but nothing was gained as the RC-2 had a tendency to leach through the mix into the sand beneath.

The pavement stands up well under both heavy and fast-moving traffic, but being a soft mix it is somewhat inclined to rut when vehicles park. Since the sandy shoulders are not too stable, cars will be apt to park on the pavement rather than along it and contribute to the scuffing action. However, the section that was completed in 1948 has already obtained an appearance of permanency and is proving satisfactory with only routine maintenance required. Typical gradation of the sand-bituminous surface course is as follows:

C. & E. M. Photo

E. H. Baggs, Resident Engineer for the State Highway Commission, and Grady Ballenger, General Superintendent, Ballenger Paving Co.

Sieve Size Passing	Retained On	Per Cent
No. 10	No. 40	6.70
No. 40	No. 80	64.00
No. 80	No. 200	24.50
No. 200	....	0.40
Bitumen		4.40
	Total:	100.00

Grading and Mixing

Grading for the contracts was figured by the mile rather than in cubic yards, and averaged about 10,000 yards per mile. On the southerly section considerable muck was removed from the roadway and then filled with sand taken from the borrow pits. But the rest of the project was mostly cut and fill grading. Both concrete pipe and Armco bituminous-coated corrugated metal pipe was used in the drainage, ranging in size up to 48 inches.

Earthwork was handled under a subcontract by M. K. Moore of Atlanta, Ga., who used two Caterpillar DW10's with 10-yard scrapers and a D7 tractor pulling a 12-yard scraper. A D8 tractor for both dozer and push loading, and a pair of No. 12 motor graders rounded out the small but adequate equipment fleet.

Over the prepared roadbed of sand moved a Wood Roadmixer pulled by a D8 at the rate of 18 feet a minute. The Wood machine contained a 1,200-gallon tank for bitumen storage, and was supplied by 1,500-gallon tank trucks that moved along by its side. The Roadmixer made two passes to cover the full 18-foot strip, mixing the sand and asphalt to a loose depth of about 6½ inches to obtain the required 5-inch compacted surface.

A width of 9 feet 4 inches was taken on the first pass along one side of the road, followed by a 9-foot pass along the other side. Thus the center was lapped 4 inches to insure full mixing at the joint. A string line was laid out at the edge of the pavement and the D8 operator followed it by means of a weight hung by a string on a rod secured to the front end of the tractor. Usually one side was done in the morning and the other side mixed in the afternoon.

Delivering the Bitumen

While the sand was there on the roadbed waiting to be picked up and mixed, the bitumen had to be transported over water for all but the 8.4-mile contract north of Oregon Inlet. Mexican Petroleum RC-2 asphalt was delivered to the job from Norfolk, Va., by the Asphalt Service Co. of Baltimore, Md. On the lower contracts, bitumen came by barge down the Inland Waterway to Sound-side wharves at Buxton, Avon, Hatteras, and Rodanthe. From these points the supply trucks hauled the asphalt to the Roadmixer.

For the 12.34-mile contract immediately south of Oregon Inlet the bitumen was delivered from Norfolk in eight 3,000-gallon feeder tank trucks. They made the 85-mile over-the-road haul to the north side of Oregon Inlet in about 2½ hours. Some of the tank trucks made two round trips a day. At the shore of the inlet the contractor set up two storage tanks of 12,000 and 11,000-gallon capacity. Burners on the feeder trucks kept the bitumen to around 120 degrees F, and the transfer to the tanks was made by a Deming 3-inch pump driven by a Waukesha engine. A 3,000-gallon tank truck was unloaded in about 20 minutes.

From these storage tanks the RC-2 was transferred into a 5,000-gallon tank mounted on a wartime LCM landing craft. The transfer was made with

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It's no secret and it's no accident: some machines move more dirt than others. With tremendous power of Break-Out Action and 41° roll-back of bucket at ground level, the DROTT SKID-SHOVEL handles more dirt per hour than any other loader.

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"SAVED $800 PER MILE with my new STOW SCREED!"

Performance like that is *important* on *any* paving job. It's the reason why so many contractors are now using STOW screeds on all their road paving jobs!

STOW vibrating Screeds:

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a Cleaver-Brooks Bituminous Booster which also heated the bitumen to about 165 degrees F so that when the material reached the Roadmixer it was somewhere between 130 and 140 degrees. The landing craft made the mile-long trip across the inlet in about 20 minutes, so that an average of 5 barge loads or 25,000 gallons of bitumen was transferred from the north side to the south side of the inlet in the average working day. A 3-inch line was used with the booster in the transfer of the bitumen.

On the south side of the inlet the bitumen was transferred from the landing craft into a 10,000-gallon storage tank by another Deming pump driven by a Le Roi engine. However, since there was no heater on the south side, the usual procedure was to pump the asphalt whenever possible from the LCM directly into the feeder-tank trucks that carried it to the Roadmixer. An average fleet of 6 trucks holding 1,500 gallons each supplied asphalt to the job. The LCM usually started its first trip at 5:30 a.m. and returned from its last passage at about 6:30 p.m. Making five trips a day and transferring 25,000 gallons of asphalt from the north to the south side of the inlet, it supplied enough bitumen to mix 3,700 linear feet of 18-foot pavement, or 7,400 square yards in a 13-hour day. Actually the Roadmixer only worked about half the day, and spent the rest of the time waiting for asphalt.

Job Problems

As noted, the actual mixing was no problem, but the aeration process, to get the water out of the sand and the naphtha out of the asphalt, was a different story. This procedure took a long time and was dependent upon the weather. For aeration the contractor employed two Seaman Pulvi-Mixers, disk harrows, and six Caterpillar No. 12 motor graders. Compaction was achieved by four Tampo 13-wheel pneumatic-tire rollers. Hauling equipment included three International ID-6 and two Farmall rubber-tired tractors. Final rolling was done with a Buffalo-Springfield 3-axle tandem roller.

The grading contractor suffered a loss of some equipment when he was transferring part of his earth-moving fleet from the Outer Banks back to the mainland. A barge carrying some machines capsized in Pamlico Sound when a sudden squall arose. Although the average depth of the Sound is only 8 feet, the place where the barge sank was 18 feet deep, making the salvaging a costly and laborious process. The Sound has a bad reputation for sudden squalls which is borne out by the maritime insurance rate, one of the highest on the east coast.

Quantities and Personnel

Over 2,000,000 gallons of asphalt was needed to pave the 605,547 square yards of hard surface on the 56-mile project. The items are broken down as follows:

Miles	Square Yards	Gallons of RC-2 Asphalt
17.32	186,227	641,364
17.8	190,670	729,000
8.41	91,000	317,270
12.34	137,650	511,500
55.87	605,547	2,199,634

The Ballenger Paving Co. employed an average force of 22 men on the project under the personal supervision of Grady Ballenger, General Superintendent. For the North Carolina State Highway and Public Works Commission, E. H. Baggs is Resident Engineer. The work is under the direction of W. N. Spruill, Division Engineer at Ahoskie. W. H. Rogers, Jr., is State Highway Engineer and W. E. Hawkins is State Construction Engineer, with W. S. Winslow, Hydrographic Engineer.

The new road along the Outer Banks will open up a section of the state that few tourists have visited. There has been a rough road or trail of sorts running along the Outer Banks and following the beach at low tide when the wet sand had compacted sufficiently to support a car, or else winding around the sand dunes. Experienced beach drivers could make the trip under favorable conditions by deflating their tires to 15 pounds pressure, and carrying along extra tanks of fuel and water for emergencies.

With the new road, however, the splendid isolation of the Outer Banks will be gone. Old-timers hope that the coming of the road will not bring an end to the game that roams the thickets and the woods on the long reef. This game includes toy deer, said to be tastier than pheasant. One of the curiosities of the Banks is the presence of wild horses or "bank ponies" that may be found among the dunes. "Bankers", as the residents of the tiny fishing villages are called, speak with a broad accent said to be Devon, but the old English colloquialisms are gradually dying out.

There is talk along the Banks that the state will build a bridge over Oregon Inlet which will make it easier for tourists to drive the whole length of the new road. For the time being, however, tourists and other visitors will cross Oregon Inlet on the free ferry. There is also some speculation that after a few years the present sand-asphalt pavement may be covered with a more permanent plant-mix-type surface. This would be more expensive to build, of course, but some local sources of shale have been discovered that may be the answer to the problem of bringing in aggregate for a plant-mix pavement.

Catalog on Machine Tools

An 88-page catalog that illustrates, describes, and gives specifications on its lathes, shapers, and drill presses has been prepared by South Bend Lathe Works, 425 E. Madison St., South Bend 22, Ind. It also shows the complete line of South Bend attachments, chucks, tools, and accessories.

The catalog features several of the company's latest machine-tool developments including a new-type pedestal tool grinder.

This literature may be obtained from the company by requesting Catalog No. 5205. Or use the Request Card at page 18. Circle No. 926.

"Hell you say?"

Like Top Hats and Snowballs

they Go Together

All-Wheel Drive and All-Wheel Steer

Getting down to fundamentals, the main job for any self-propelled grader is to move a satisfactory amount of material with the blade, and keep traveling in the desired direction. To move a satisfactory amount of material requires adequate traction. To keep traveling in the desired direction means that a way must be found to overcome the side thrust of the load on the angled blade . . . if such control is lacking, one end of the grader or the other slides sideways.

Traction and *directional control* . . . these are the fundamental problems of the designer. They are completely solved in Austin-Western "88-H," "99-H" and Master "99" Power Graders by exclusive all-wheel drive and all-wheel steer. They can never be completely solved in an ordinary front steer, rear drive grader.

All-Wheel Drive and All-Wheel Steer work as a team, each making the other doubly effective. All-Wheel Drive provides 30 per cent more Power-at-the-Blade. All-Wheel Steer provides all-around maneuverability not approached by ordinary motor graders. This is why Austin-Western machines go places where others cannot go . . . do things other graders cannot do.

In the photograph above, an Austin-Western "88-H" is using both All-Wheel Steer and All-Wheel Drive to work smoothly and easily around a short radius curve, which a front steer, rear drive grader could not negotiate. Rear steer provides the required maneuverability . . . the live power in the front drivers completely nullifies the tendency—always present in ordinary motor graders—for the rear drivers to increase the turning radius by skidding the dead front end sideways.

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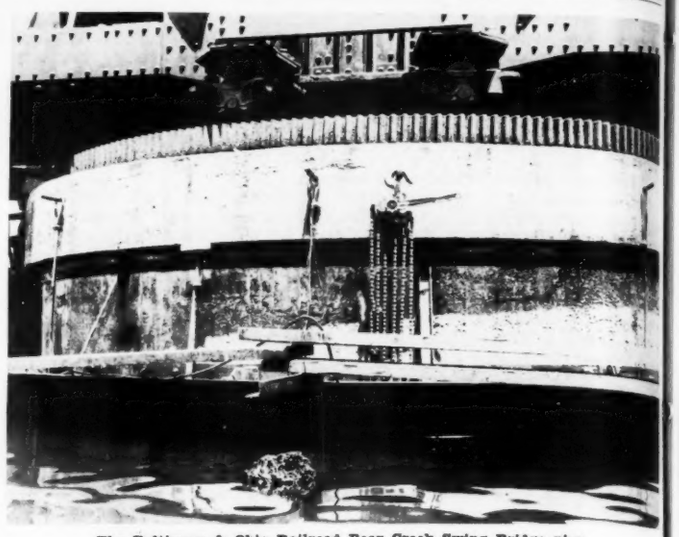
Booklet on Wire Rope

A pocket-size booklet on the use and care of wire rope is available from A. Leschen & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo. It contains 72 pages of practical information on proper methods of handling, reeving, breaking in, splicing, cutting, lubricating, and specifying wire rope. It includes illustrations, diagrams, and charts.

This literature may be obtained from the company by requesting Booklet No. C-51, or by using the Request Card at page 18. Circle No. 909.



The Baltimore & Ohio Railroad Bear Creek Swing Bridge pier.

New Concrete Poured Between Mold and Pier

The disintegration of the concrete in a 26-foot-diameter bridge pier presented the Baltimore & Ohio Railroad engineers with a complicated repair problem. The pier supported the railroad's Bear Creek Swing Bridge in Baltimore, Md., and in order to retard future disintegration, the following plan was adopted. The contractor, Masonry Resurfacing & Construction Co., Baltimore, encircled the pier with a mold of 3/16-inch wrought-iron plate, 7 feet high and extending about 1 foot above the water line. The pier was then sealed at the bottom and made watertight, the disintegrated material was removed, and new concrete was poured into the 16-inch space between plate and pier. The corrosion-resistant mold was left in place as an added measure of protection. The B&O RR's own shops in Martinsburg fabricated the wrought-iron plates.

Illinois Traffic Conference

The Fifth Annual Illinois Traffic Engineering Conference will be conducted on the campus of the University of Illinois, Urbana, Ill., on December 11 and 12. It is sponsored by the Department of Civil Engineering at the University in cooperation with the Illinois Division of Highways, the Midwest Section of the Institute of Traffic Engineers, the Illinois Traffic Safety Council, and the Illinois Municipal League.

The sessions, some of which will be conducted as seminars with panel discussions and question periods, will aim at providing practical traffic engineering information for the representatives of municipal organizations and other groups concerned with traffic improvement. Requests for additional information may be addressed to R. K. Newton, Supervisor, Engineering Extension, 713½ S. Wright St., Champaign, Ill.

Structural-Steel Bolts

A bulletin describing its high-tensile structural-steel bolts has been issued by Paper, Calmenson & Co., County Road B and Walnut St., St. Paul 8, Minn. It describes the development and applications of Pacal bolts and points out advantages and economies possible by using high-tensile-steel bolts in place of rivets for assembling structural joints. The bulletin gives available sizes as well as specifications for the assembly of structural joints using steel bolts and ASTM tentative standard specifications for steel bolts and studs.

This literature may be secured from the company, or by using the Request Card at page 18. Circle No. 878.

Fastest THROUGH CONCRETE

and YOU GET MORE HOLES PER DRILL with TERMITES

(ask any TERMITE user)

NO MASONRY TOO TOUGH . . .
Where ordinary drills fail, TERMITES *keep going* to give you today's fastest and lowest-cost masonry drilling! Here's why:

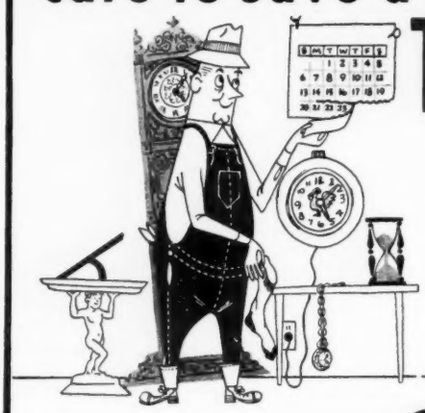
1. TERMITES' *continuous* spiral worm, beginning at the grinding inserts, starts to carry away material the instant it is pulverized.
2. TERMITES' exclusive "WICTU" inserts last longer and cut faster.

Use TERMITES on your next drilling job . . . they're engineered to give you "more holes per dollar." Diameters from ¼" to 5". Lengths up to 36". Use with electric drills. Literature available.

Order today through your distributor

TERMITE ROTARY MASONRY DRILLS
Made only by TERMITE DRILLS, INC.
87 N. Lotus Ave. Pasadena 8, California

care to save a week's TIME?



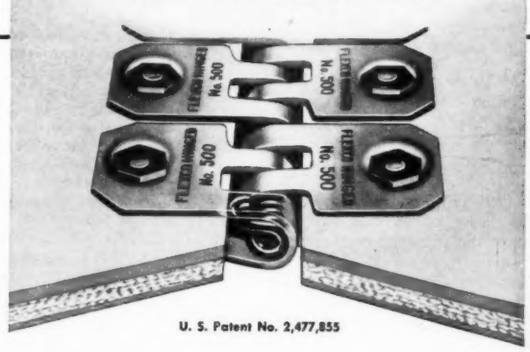
CURE WITH Fulco COTTON CONCRETE CURING MATS

Yes, Fulco mats can save you up to seven day's time over old-fashioned wetting methods — because they're all "set" to serve in 72 hours! Fulco mats stay wetter *longer* . . . cure concrete quicker, better, and cheaper. They increase the flexural strength of concrete by insulating against sudden temperature changes, and may be used again and again (making the cost per job negligible). The U. S. Department of Agriculture has proved conclusively, in field and laboratory tests, that cotton concrete curing mats cure concrete more effectively than any other method! See your equipment dealer for prices, or wire direct!

Fulton also manufactures sturdy, Fulton Triple Strength Tarps, Drop Cloths and Tents. Indispensable protection at economical prices.

Fulton BAG & COTTON MILLS
Atlanta • St. Louis • Dallas • Kansas City, Kans. • Denver • New Orleans
Los Angeles • Minneapolis • New York City, 347 Madison Avenue

. . . the new separable
FLEXCO HINGED BELT FASTENERS



U. S. Patent No. 2,477,855

- For joining grader, trencher, ditcher and other earth moving conveyor belts.
- For belts ⅜" to ½" thick.
- A FLEXCO fastener that is HINGED. Has removable hinge pin.
- Troughs naturally, operates through take-up pulleys.
- Strong, durable . . . pull or tension is distributed uniformly across joint.

Order From Your Supply House. Ask for Bulletin HF 500.

FLEXIBLE STEEL LACING CO. 4608 Lexington St., Chicago 44, Ill.

Distributor Doings

Former Competitors, Now United, Offer First-Class Dealer Service

• IN adjoining offices under Caterpillar's distinctive yellow paint in a building at 245 West South Temple Street in Salt Lake City, Utah, two men are pooling their talent and their enthusiasm for the equipment business. What they have created, working together, is Wheeler-Kershaw Co., a formidable but ultra-efficient distributorship. Contractors who walk through the front door and see how these two men are operating can't believe their eyes.

For it hasn't been too long since J. K. Wheeler and Walter Kershaw were at each other's throats. Kershaw, then with the Lang Company, was plugging certain items painted red. Wheeler, in partnership with H. D. Landes, operated under a distinctive yellow banner. And he'll admit, when you press him, that "Walter Kershaw is the toughest man to compete with on a deal in the whole business." Kershaw, on the other hand, says, "I learned everything I know about the equipment business from J. K. Wheeler."

Be that as it may, the two men have joined forces so well that the firm is already well known by its new name. Kershaw and Wheeler have never forgotten many deals in which each man bested the other, but out of these experiences of ten years ago has come a mutual respect which is good for their business.

Today's partnership began about 26 years ago, when J. K. Wheeler and H. D. Landes introduced Caterpillar equipment to Utah. Kershaw, meanwhile, had joined the Lang Company, although his years in the equipment business are not as numerous as Wheeler's.

In 1943, Landes and Wheeler sold out, and control of the business switched to Don Robison. Landes and Wheeler established the M&O Ranching Company, near Salina, Utah, and for two years specialized in purebred Herefords. Wheeler, who couldn't get the yellow paint out of his blood, came back in the equipment business in 1945 by establishing J. K. Wheeler Machinery Co. Until Kershaw joined forces with him in July last year, he and his present partner engaged in the tough competition which has made them well known to contractors, public officials, and other equipment users in the state.

Past Deal Creates New Policy

Wheeler - Kershaw's policy toward its customers originated simultaneously several years ago when the two men were bitter competitors.

A job had been let over in Utah's Vernal Basin. It was a good project, calling for a sizable equipment outlay. Both men began to put the heat on the deal. The battle grew. Day and night, practically, Kershaw and Wheeler gave that deal their utmost attention. Finally the blue chips were down, and the time had come for the commission to make a selection between red and yellow equipment. They called both men in.

"We can't make a selection", they admitted. "You've both convinced us of your point of view. We don't want to mix equipment, so what do you say we toss a coin between you?"

Wheeler won the toss.

On the way back to Salt Lake City—separately, in different automobiles—Kershaw was fighting mad, but not too angry to think clearly. Obviously here was a case where salesmanship and other such factors were equal. Surely,

(Continued on next page)

Kay Day Photo

A general view of Wheeler-Kershaw's display floor. Customers shopping for Caterpillar engines run the gauntlet of a formidable sales force through here.

Ray Day Photo

Jean Byrant, one of the girls who takes care of the 10,000 parts cards at Wheeler-Kershaw Co., makes some price changes on the cards.

THE JACKSON
ASPHALT-GRANULAR SOIL
COMPACTOR

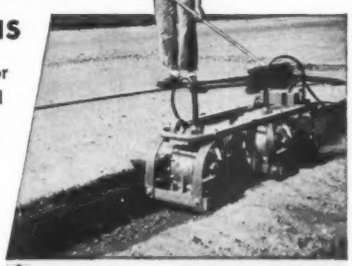
NOW
VASTLY MORE POWERFUL,
FASTER
Quickly

INTERCHANGEABLE BASES
OF 12" TO 24" WIDTHS

The new, heavy-duty, exceedingly powerful vibratory motor now incorporated in the JACKSON COMPACTOR has stepped up its walking speed and power greatly. It will compact granular soils at optimum moisture to specified density in depths of 8 to 12" at the rate of 2400 sq. ft. per hour.

For compacting granular soil in sub-bases of concrete floors, in bridge approaches, close to abutments, and for compacting blacktop mixtures in pavement widening and patching, paving drives, walks, railway platforms and crossings, this machine with its quickly interchangeable bases, is the most convenient, mobile and efficient time and money saver on the market. A tandem version utilizing two heavy-duty compactor motors mounted on bases of proper width is amazingly efficient and economical for compacting granular fill in trenches, in pavement widening operations, to provide a stabilized base for the blacktop widening strip.

Operated by a Jackson Power Plant mounted on auto trailer with means of quickly picking up and lowering the compactor. See it at your Jackson Distributor, who has it both for sale and for rent, or write for complete details.



Tandem Compactor stabilizing granular sub-base for blacktop pavement widening strip.

Tandem Compactor easily keeps up with spreader and is controlled by spreader operator. No additional labor is required.

JACKSON
VIBRATORS, Inc.
LUDINGTON
MICHIGAN

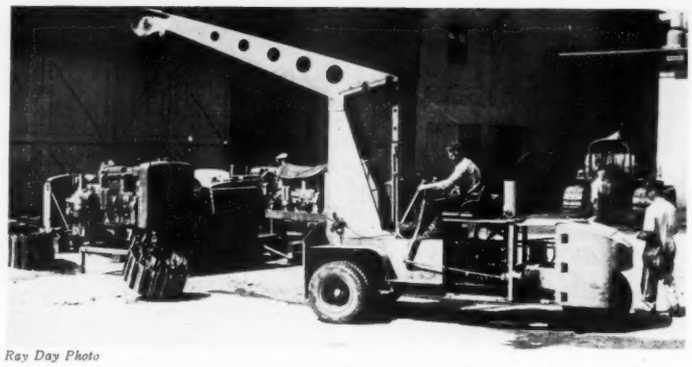
Distributor Doings

(Continued from preceding page)

if his company built up some kind of a plus value, that should make the difference in a case of this kind. What was the answer? He searched his background, and decided that a better stock of parts and a better service policy than his competitor might have done the trick.

Wheeler, in the other car and with the contract in his pocket, was equally angry. It rankled his soul to have a contract based on the flip of a coin, which he still believes is "a hell of a poor way to buy equipment". In his own mind he searched for something which would justify that contract. Independently of Kershaw, he came up with practically the same answer.

Each in his own way started to do something about it. Much progress was made by both. But now that they have pooled their talents, the fullest development of that basic idea has come to pass. Wheeler-Kershaw's parts inventory is one of the most complete in the nation, and certainly one of the better ones in the Rocky Mountain west. Its repair service is so well thought of that many contractors are beginning to call the company's service trucks and mechanics to do work they formerly hired mechanics to do.



Ray Day Photo

For heavy moving, loading heavy parts, and all sorts of odd jobs, this Hyster crane is invaluable. It's picking up a set of tracks for a Caterpillar tractor.

Territory and Organization

Wheeler-Kershaw's territory includes the state of Utah, with a variety of topographical and climatic conditions. Utah's contractors are tough babies, too. When it comes to a business deal, they buy equipment without wasting money.

To build the plus values of bigger parts stocks and better service into their business, Wheeler and Kershaw started from scratch after repeated conferences. The organization is still not fully polished, but less than a year after the company was formed it has been well roughed in.

Organizationally, Salt Lake City is headquarters for all operations. Nine salesmen work in the field from Salt Lake City, with three extra men available. Two men are assigned to agricultural sales. Wheeler-Kershaw handles other lines of equipment, such as shovels, draglines, crushers, and so on, but the salesmen who work with Caterpillar products are on those machines exclusively. Business prospects are classified, too, and salesmen who call on city or county engineers usually do not mix in contracting calls.

The company has no more aggressive salesmen than Wheeler and Kershaw personally, however. The organization has no bosses, as such, and everybody works hard to justify his place on the payroll. In many respects Kershaw and Wheeler work harder than anybody.

The service organization is built around a shop setup in Salt Lake City, but with an additional feature of emergency crews. There are five such emergency crews available for call, and one measure of the success of this part of the organization is the fact that emergency crews don't usually work less than about 60 hours a week. Contractors more and more are calling on this service to round out their own mechanical operations.

The Organization at Work

The organization at work is deserving of its reputation. Every morning, usually long before 8 a.m., a line of yellow-painted Chevrolets lines up before the company headquarters building. Salesmen make the last-minute checkups on their calls, and service men get ready to go out.

These salesmen have something to sell, too. When CONTRACTORS AND ENGINEERS MONTHLY visited the company's

Heltzel BUILDS IT BETTER

HELTZEL HELPS
CONSTRUCTION DOLLARS
GO FURTHER

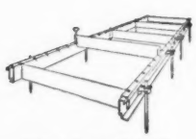
SAVING COST AND TIME ON A HOSPITAL CONSTRUCTION JOB

PROBLEM: To set a curb fast enough to be completed for a paving job scheduled on the following day. Available labor lacked special skills and experience.

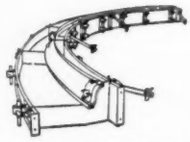
ANSWER: Standard Heltzel dowel joint curb forms were used on the job with economy of time and money. Common labor on the job easily managed setting of the forms because Heltzel forms are designed with exclusive, practical aligning and staking devices.

● For more than 40 years Heltzel forms have been recognized as "tops" by leading contractors and engineers in the construction industry. This reputation results from Heltzel Engineers working closely to requirements of form setters and specification engineers. Heltzel Steel Forms, both standard and special, are illustrated and described in Bulletin L-20. Write for your copy and see where Heltzel can make your construction dollars go further.

COMBINED CURB AND GUTTER FORMS



HELTZEL SIDEWALK FORMS



HELTZEL RIGID RADIUS FORMS

HELTZEL FLEXIBLE FORMS

Heltzel BUILDS IT BETTER
The Heltzel Steel Form & Iron Company
Construction Equipment Since 1910
Flex-Plane
WARREN, OHIO

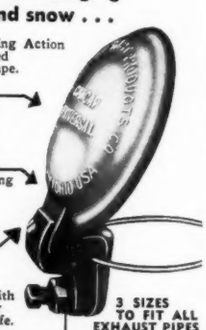
NEW IMPROVED! CANCAP automatically protects tractor exhaust systems from damaging rain, sleet and snow . . .

New Wider Opening Action Allows Unrestricted Exhaust Gas Escape.

Lightweight Cast Aluminum Cap Opens with First Puff Of Exhaust.

New, Long Wearing Malleable Iron Hinge Insert Built Right Into Lightweight Cast Aluminum Cap.

Cadmium Plated Locking Screw With Shakeproof Washer Insures Longer Life.



PROMPT DELIVERY
At Dealers Or Order Direct From
Canton Manufacturing Co.
2400-13th St., N.W.
Canton, Ohio

3 SIZES TO FIT ALL EXHAUST PIPES FROM 1¾" TO 5" O.D.

NO. 2 CANCAP —fits all exhaust pipes from 1¾" to 2½" $1.90 ea.

NO. 3 CANCAP 2½" to 3½" $2.25 ea.

NO. 4 CANCAP 3½" to 4¼" $2.75 ea.

NO. 5 CANCAP 4¼" to 5" $3.75 ea.

NO. S-3 CANCAP —fits John Deere A, B, D, G, M, R tractors $1.90 ea.

makers of the CANTON TENSION PULL LOAD BINDER

BEFORE YOU BUY SPREADERS for Sand, Cinders, Salt or Aggregates FIND OUT WHY—

FLINK SPREADERS

Over 5000 Are in Use by Hundreds of City, County and State Highway Departments, Contractors, and Transit Companies

The Flink "POWER-MATIC"—Model HD41 (shown above)—is ideal for ice control, dust control, road building and maintenance. Fits all dump trucks as a replacement tail gate. Does not limit use of truck to spreading. Spreads full or half width, forward or backward. Safe to use in traffic. Controls from cab. Hydraulic or chain-drive models available. Flink's better control, and faster spreading with less waste of material are the results of 14 years of building and developing automatic spreaders.

Model SS
FLINK "Pull-Type" SPREADERS

A new improved Spreader for sand, cinders and all other granular materials used for ice or dust control and seal coating. Large hopper for easy charging. Widely used by military airports.

Write for Literature and the Name of Your Nearest Distributor

THE Flink co. Dept. 188
STREATOR, ILLINOIS

headquarters, the new equipment yard contained a No. 24, a No. 60, a No. 70, and two No. 80 scrapers, a D8, three No. 12 motor graders, three DW20's, and a good assortment of industrial engines up to D17000. The used equipment yard had a pair of motor graders, a D8, and some small equipment.

Equipment service work at Salt Lake City is just as well organized in action as is the sales effort. Wheeler-Kershaw does a considerable amount of overhauling of Army tractor equipment, as well as contractor-owned machines. The shop is set up in departments, so that washing, steam cleaning, welding, motor repair, electrical-system repair, painting, testing, and so on are separated. There are specialists in all these different phases of equipment repair. When a machine is repaired in these shops, both Wheeler and Kershaw will stand behind it.

Parts are equally well handled. Slowly but surely this department is being expanded to meet any demands which might be placed upon it. It is the habit of Caterpillar distributors to send circular letters around to each other, each week, to pool what items happen to be in short supply. The number of items which appears on the Wheeler-Kershaw sheet each week is small. The worst thing that ever happened, so far as anyone can remember around the organization, is the fact that a motor grader was tied up once for 3 weeks waiting for a part which happened to be in short supply. Usually such repairs are done in a matter of hours, and the machine can go back to digging.

The company's card-filing system is unusually good. Each card is absolutely accurate and complete. Each card lists the number of units of that part in stock, the number used by quarters during the past 5 years, the current selling price, and the part number. Incidentally, Wheeler-Kershaw has one and only one price to all its customers.

When calls come in for information regarding parts, any of the girls at the filing desk can tell the customer what he wants to know simply by pulling the proper card. Back in the storerooms the parts bins are similarly arranged, and a work sequence is organized so that parts are entered on the cards before they are put away. The withdrawal of any part is never made until the transaction is entered on the filing system.

Small parts are stored in small bins, but heavy items are handled on wood platforms and are hoisted if necessary by a fork loader. A Hyster crane in the yard handles all heavy lifts there.

One of the most unusual features of the parts setup is the crew, which has no quitting time. This crew takes care of shipments of orders which arrive by mail during the day. It is composed of two alert young students, working their way through the University of Utah. They go to work with standing orders not to stop until all the orders are filled and mailed.

Salesman's Word is Law

It has cost the company money several times to do so, but if a salesman tells a customer something, his company will stand behind him. A contractor recently came in with some misunderstanding based on what a salesman had told him. Wheeler and Kershaw both shrugged, grinned, and said, "If that's what he said, that's the way it'll have to be. Let's see if we can't get you fixed right up."

Good reputations are built on policies like that. As a matter of fact, Kershaw is still well known after almost ten years for a customer-adjustment stunt he pulled when he was still selling Internationals. A customer had objected and objected, protested and protested. Finally he got around to making open, and unfavorable, comparisons. Kershaw took his checkbook, paid $18,000 for a new D8 Caterpillar at that time, and presented it to the contractor with the company's compliments. That's one way of building customer confidence.

Both Wheeler and Kershaw believe the equipment market is turning again in the buyer's favor, and barring an abrupt change in the world situation, they believe equipment and parts should get more plentiful in 1952.

Both men have nothing but praise for contracting outfits and public agencies which really take care of their equipment, and give it the service it needs. Wheeler cited the Peter Kiewit Sons' Co. as an outstanding example of intelligent use of equipment. "They get every ounce of horsepower out of that equipment, but they service and take care of it while they're doing it. It always looks fine, and you can take it in on a trade and know that it won't be all welded together, butched up, and worn out", he said.

Sometime in the years ahead Wheeler hopes to get back a bit closer to the land, and to ranching. But he has a troublesome personal conflict which no doctor can resolve for him. The years have put a big amount of yellow paint in his blood. He feels exactly the same way about Caterpillar equipment that Senator Connally feels about Texas.

And as long as he feels that way, it looks like he and Kershaw have got a lot of business to do.

Dealers—this is your department, so send us your news—new plants, new lines, new staff appointments.

Cleco Appoints Four New Dealers

The Cleco Division of Reed Roller Bit Co., Houston, Texas, has appointed four new dealers—S. L. Fusco, 4937 E. Olympic Blvd., Los Angeles 22, Calif.; Pauli & Griffin Co., 509 Sixth St., San Francisco, Calif.; William J. Boss Co., Glens Falls, N. Y.; and Bison Machinery & Tool Co., 709 Seneca St., Buffalo 10, N. Y.

Cleco manufactures the Cleco and Dallett lines of air tools and accessories.

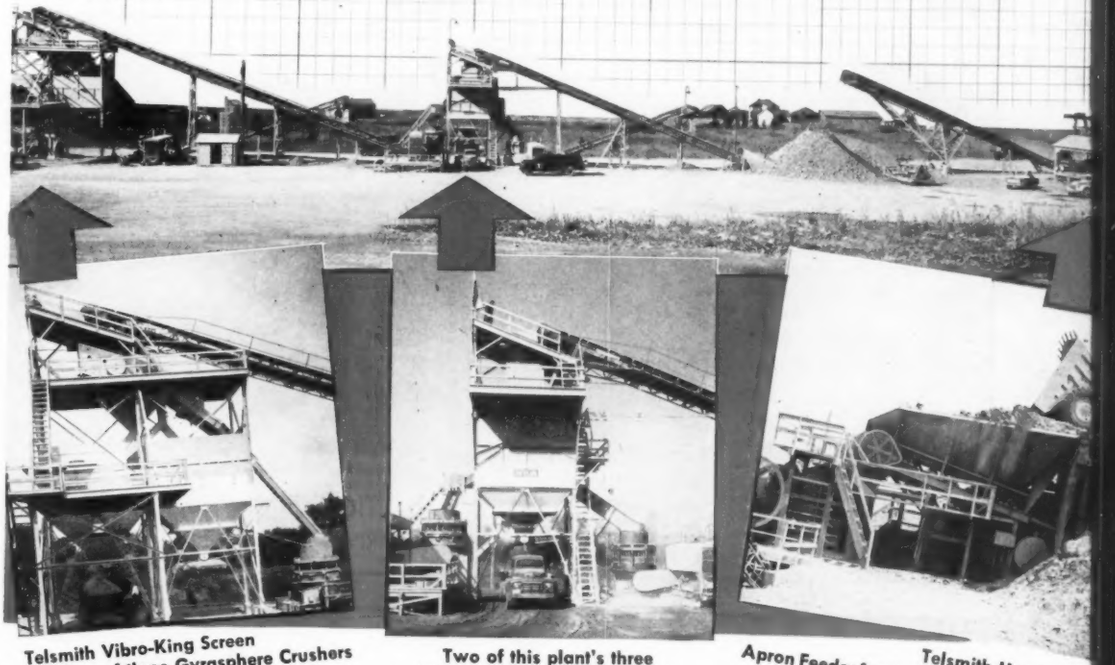
Maranuk for Baker-Raulang Sales

Walter S. Maranuk has joined the Detroit staff of the Baker-Raulang Co., Cleveland, Ohio. With a background of more than a decade in the material-handling industry, he will

(Continued on next page)

ENGINEERED by TELSMITH

TO PRODUCE 300 T.P.H. FOR NELLO L. TEER CO.



Telsmith Vibro-King Screen and one of three Gyrasphere Crushers

Two of this plant's three Telsmith Gyrasphere Crushers

Apron Feeder feeds 30"x42" Primary Jaw

Telsmith Heavy-Duty

TELSMITH
Equipment in this plant

One (1) 42" x 14' Heavy-Duty Apron Feeder
One (1) 36" x 6' Heavy-Duty Plate Feeder
One (1) 5' x 12' Pulsator Double Deck Scalping Screen
One (1) 489 Special Coarse Gyrasphere Secondary Crusher
Two (2) 48 Fine Crushing Gyrasphere Tertiary Crushers
One (1) 5' x 12' Vibro-King Triple Deck Finishing Screen
One (1) 20" x 15' Twin Screw Classifier
Five (5) Telsmith-BG Conveyors, 18" to 30" wide, 72' to 150' long

● Large capacity of hard and abrasive granite, crushed to small sizes, features this Durham, North Carolina quarry plant. Telsmith-engineered-and-equipped to fit local conditions, it produces minus 1½" traffic-bound macadam, minus ¾" stone for asphalt plant, and minus 2½" concrete stone; all meeting North Carolina State Specifications, and used in black-top plants and for roads and concrete construction.

Reliable tests show a capacity of about 300 tons per hour of minus 1½" including about 70 tons per hour of minus ⅜" asphalt stone; or, about 170 tons per hour when producing all minus ¾" stone. Its three (3) Telsmith No. 48 Gyrasphere Crushers are responsible for this high capacity of small sized products.

Take your aggregate production problems to Telsmith Engineers. Send for Bulletin 266. Q-23

SMITH ENGINEERING WORKS, 4014 N. HOLTON STREET, MILWAUKEE 12, WISCONSIN

Cable Address: Sengworks, Milwaukee

51 East 42nd St. New York 17, N. Y. · 211 W. Wacker Drive Chicago 6, Ill. · 713 Commercial Trust Bldg. Philadelphia 2, Pa. · 238 Main Street Cambridge 42, Mass. · Boehck Eqpt. Co. Milwaukee 3, Wis. · The McLean Co., 3525 Lakeside Ave. Cleveland 14, Ohio

Marens Eqpt. Co., 432 Main St., Rochester, Mich. • Clyde Eqpt. Co., Portland 9, Ore., & Seattle 4, Wash. • Mines Eng. & Eqpt. Co., San Francisco 4, Calif.

Distributor Doings

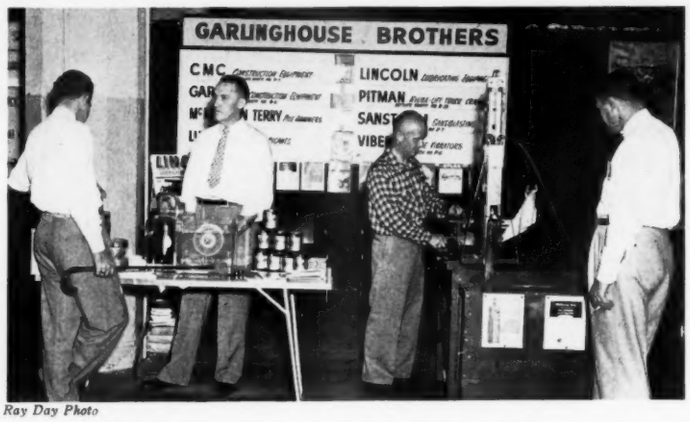
(Continued from preceding page)

serve as a Vice President of H. A. Stevenson, Inc., 2988 E. Grand Blvd., Detroit, distributors of Baker industrial trucks in Michigan.

Bemiss Equipment Opens New Plant

This month, Bemiss Equipment Corp., Richmond, Va., formally opened its new plant at 224 W. Fourth St., Salem, Va. Modern heavy-construction equipment was displayed and refreshments and dinner were served to the attending factory representatives.

The dealer represents Allis-Chalmers Mfg. Co.; Bucyrus-Erie Co., Inc.; Chicago Pneumatic Tool Co.; Detroit Diesel Engine Division of General Motors Corp.; The Elgin Corp.; Pioneer Engineering Works; Seaman Motors.



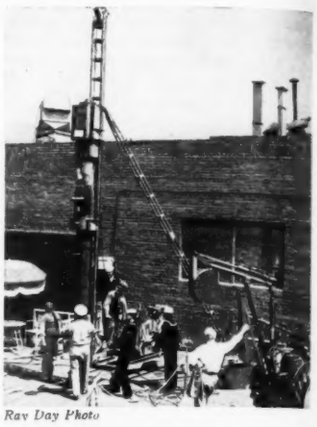
Ray Day Photo

This is Garlinghouse Bros'. display booth at the APWA show at Los Angeles. A Lubriplate demonstration goes on at the left, while a McKiernan-Terry model pile hammer drives a pile on the right-hand side of the picture.

APWA Show Draws Distributors

Los Angeles equipment distributors turned out in force at Los Angeles' Shrine Auditorium August 24-27 for the 58th Annual Congress and Equipment Show of the American Public Works Association. Equipment designed for all types of construction, maintenance, and general city work was on display inside the auditorium, as well as outside on adjacent display grounds. Some 1,000 delegates saw the display, together with an untold number of visitors.

Among the Los Angeles distributors were Garlinghouse Bros.; Crook Co.; Brown-Bevis Machinery Co.; Smith Booth Usher Co.; Shepherd Tractor & Equipment Co.; and Tractor Sales Corp. Also represented were about 70 manufacturers of various kinds of equipment, from power graders to leaf-picking machines. Contractors, officials from cities, counties and states, and department heads of the Army, Navy, and Air Force attended the exhibits. In addition to the demonstration of small equipment, there were demonstrations of a diesel-powered pile driver, an outfall-pipeline-cleaning demonstration, and routine showing of new equipment maneuverability.



Ray Day Photo

Navy Seabees from the Port Hueneme base try the diesel-powered pile hammer at the APWA show.

Most of the sessions were slanted toward municipal work, either on a construction or maintenance basis. Instead of prepared papers for the program, a "What's Your Question?" system was used, with panels of experts assigned to answer questions brought up by delegates and visitors. Among subjects discussed were parking facilities and traffic controls; street maintenance (including refuse collection and disposal and snow and ice control); street lighting; safety; and public relations.

Euclid in Washington and Alaska

Euclid Road Machinery Co., Cleveland, Ohio, has appointed Philpott Equipment Co., Seattle, Wash., as a distributor for Euclid earth-moving equipment. The dealer's territory includes: all of the Washington counties west of and including Whatcom, Skagit, Chelan, Kittitas, and Yakima, with the exception of the southern counties of Klickitat, Skamania, Cowlitz, Clark, and Wahkiakum; and Alaska, where branches will be maintained at Anchorage and Fairbanks.

George M. Philpott heads the organization, with J. G. Woodford as Manager of the Washington and Alaskan operations. In Seattle, Ward Meyers is Parts Manager and Frank Godfrey, Service Manager. Carl Lottsfeldt is Manager at Anchorage, and Warren Sullivan at Fairbanks.

New Dealer for Schield Bantam

Kessler-Simon Machinery Co., Oklahoma City, Okla., has been appointed a distributor for Schield Bantam Co., Waverly, Iowa, manufacturer of truck-mounted power cranes, draglines, shovels, backhoes, clamshells, pile drivers, and magnet cranes. The dealer will give field engineering advice on the proper selection and application of truck-mounted Bantam cranes and shovels and, in addition, will offer job estimating and planning services with Schield

DIGS, SHOVELS, LOADS, FASTER and EASIER
At LESS COST
because... it's a PIPPIN EXCAVATOR

The PIPPIN is a rugged, dependable, hydraulically-operated digger with hydraulic motivated bucket control.

The PIPPIN Excavator is a versatile machine that performs with economy, speed and efficiency on any digging job—footings, trenches, septic tank work, pipe laying, truck loading, hoisting, lowering, cemetery grave digging and many other similar operations.

Buckets are available as follows: Back Hoes—12, 15, 18, 24, 30 and 37 inches. Grave digging bucket—34 inches. Shovel bucket—22 inches.

The PIPPIN Digger is now available for Ford, Ferguson and Schramm Pneumatractor. The latter carries a 105 cubic foot compressor. The Ford and Ferguson Tractors can be readily equipped with an especially designed 33 cubic foot Lindsay compressor.

Write for illustrated literature

PIPPIN CONSTRUCTION EQUIPMENT CO., INC.
WHITE RIVER JUNCTION, VERMONT

CHINOOK WIND
TRADE MARK REGISTERED

QUICK,
CLEAN,
SAFE
PORTABLE HEAT

PATENTS PENDING

Maximum capacity 500,000 BTUs

The solution to heating problems of winter time construction. Chinook is being hailed as revolutionary for crop drying, floor laying, thawing, aircraft warm-up, etc. In fact wherever instant, SAFE, on-the-spot, controlled heat is needed...CHINOOK WIND is providing it...CHEAPER.

Utility Model, $198.50: Little Chinook $95.50
– Fully Guaranteed f. o. b. Denver

For full details about Chinook Heaters and Torches write

INTERNATIONAL MANUFACTURING CO.
2249 South Delaware Street Denver, Colorado

Little Chinook Wind
Maximum capacity 100,000 BTUs

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Bantam equipment methods. Its territory includes western Oklahoma.

Located at 1545 Exchange Ave., Kessler-Simon also represents R. G. LeTourneau, Inc., LeRoi Equipment Co., Wayne Cranes, Barnes Mfg. Co., Warco Motor Graders, and Contractors Machinery Co.

Equipment Firm Ups McCrossin

C. Douglas McCrossin, former Service Manager, has been elected Vice President in Charge of Sales of The Paving Supply & Equipment Co., Washington, D. C. In addition, H. Erskine Fraser was re-elected Secretary-Treasurer, a position he has held since 1942.

As part of an expansion program, the company recently developed the Diesel & Ignition Co., a division to repair and service all types of diesel-injection equipment and electrical systems on construction, marine, and industrial machinery. The firm also acquired Tool & Supply Co., Baltimore, Md., from Ramset Co., Cleveland, Ohio, and thus expanded its Small-Tool Division.

Syntron Newark Sales Co. Moves

Syntron Newark Sales Co. has opened a new headquarters in Hasbrouck Heights, N. J., at 140 Route 17 and Henry St. The company—sales organization for Syntron Co., Homer City, Pa.—represents and sells the entire line of Syntron vibratory material-handling equipment, selenium rectifiers, shaft seals, paper joggers, heating elements, and allied equipment. Service is available on all tools.

Rental and sale of electric hammers, gas-hammer paving breakers, and rock drills, portable electric saws, and concrete vibrators will be handled at the same address by Syntron Power Tool Co.

Brown-Bevis Handles Bucyrus-Erie

Brown - Bevis - Industrial Equipment Co., Los Angeles, Calif., is a newly appointed distributor for Bucyrus-Erie Co., South Milwaukee, Wis. The dealer firm will handle Bucyrus-Erie tractor equipment in Los Angeles and Orange Counties. B-E's line includes 4-wheel scrapers, cable and hydraulic bulldozers and Bullgraders, Dozer-Shovels, rippers and grubbers, and allied equipment. All machines are designed and built for use with International industrial tractors.

Brown-Bevis-Industrial has taken on additional experienced tractor-equipment men for servicing.

New Warehouses for A. O. Smith

A. O. Smith Corp., Milwaukee, Wis., has signed four steel warehouses in the A. M. Castle & Co. chain as stock outlets for Smith safety grating. The warehouses at San Francisco, Seattle, and Los Angeles are functioning as subdistributors for Bufnel Co., Ltd., Smith grating distributor on the west coast. The fourth A. M. Castle outlet, a stocking distributorship in Kansas City, will operate through the company's Southwest District Office at Houston, Texas.

Eaton Metal Products Co., Denver, Colo., has also signed as a stocking distributor for Smith safety grating.

Littleford Dealer in Philadelphia

Pavlov Equipment Co., 847 E. Chelten Ave., Philadelphia, Pa., is the new dealer for Littleford Brothers, Inc., Cincinnati, Ohio, in Philadelphia and the surrounding territory. The company will handle Littleford's complete line of road-construction and maintenance equipment, the Kwik-Steam generator, and roofing equipment.

M. C. Pavlov, who heads the distributorship, has been selling to contractors for over 25 years.

Two Distributors for Stewart-Hall

Stewart-Hall Chemical Co., Mount Vernon, N. Y., has selected two new distributors for its Super Greasemaster degreasing compound: Interstate Equipment Co., Statesville, N. C., to cover that state; and The R. St. Germain Co., Montreal, Canada. The latter firm will also distribute the Sludgemaster, a fuel oil additive for eliminating sludge and water condensate in all grades of fuel oil, and will represent Stewart-Hall throughout Canada.

Kentucky Dealer for Gar Wood

Shipley, Inc., Louisville, Ky., has been appointed a distributor for the Wayne Division products of Gar Wood Industries, Inc., Wayne, Mich. The dealer firm will handle the Division's complete line of truck hoists and bodies, winches, cranes, pole derricks, Load-Packer refuse collection units, and elevating end-gates.

The Shipley territory covers 39 counties in Kentucky and 8 in Indiana.

Richkraft Has Canadian Dealer

Webster & Sons, Ltd., has been appointed the representative in Canada of The Richkraft Co., Chicago, Ill., manufacturer of reinforced papers, Richflex reflective insulation, and Richbead corner beading for dry wall construction. Webster maintains offices at Montreal, Ottawa, Quebec, Toronto, and Truro.

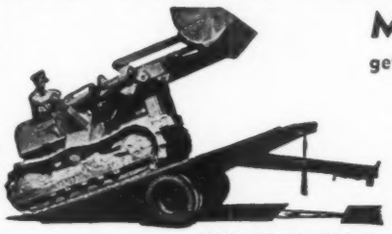
Gladden Opens Distributorship

Gladden Products Corp., Glendale, Calif., manufacturer of gasoline engines, has set up a new factory-owned distributorship at 10 W. 19th St., Kansas City, Mo. Walter Fulton is Manager of the new branch, and will handle both sales and service from Kansas City. The plant has complete warehouse facilities and a parts department.

CUT JOB-TO-JOB TIME LOSS!

MILLER *Tilt-Top*

gets slow machines there faster!



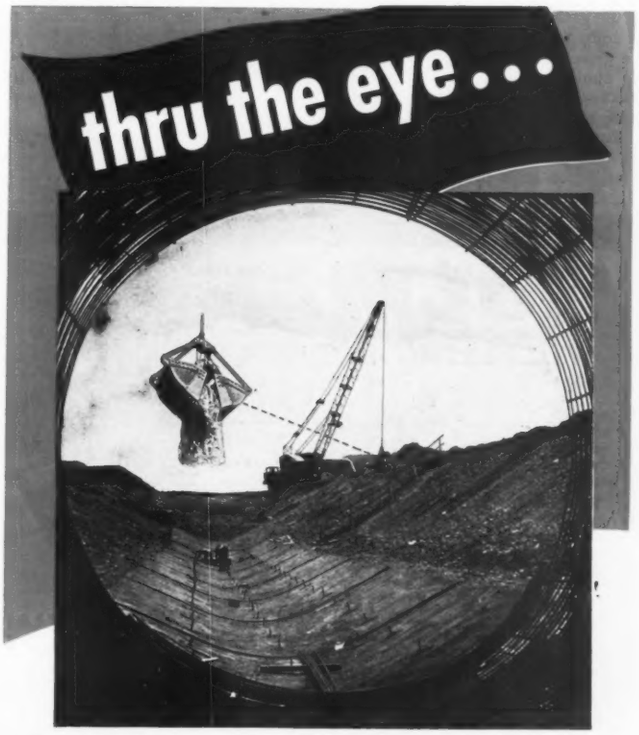
MODEL "B" 10 TON $1175. The following equipment is optional and extra: hydraulic tilt control, two speed winch, electric brakes.

Where large flat bed trailers are usually too cumbersome for lighter hauling . . . a MILLER Tilt-Top is always handy for moving slow machines from one operation to another. Self-moving equipment practically loads itself onto tilted platform and can be towed to the next operation in jig time . . . cutting non-productive time for operator and equipment to a minimum. Standard platform is 14' x 8', optional 16' available.

IMMEDIATE DELIVERY
SEE YOUR DEALER or WRITE
Dept. C-11 456 SOUTH 92nd ST.
MILWAUKEE 14, WIS.

MILLER Tilt-Top TRAILERS research engineers

thru the eye . . .



of a Culvert, a Contractor, or an Operator an OWEN BUCKET *"looks good"*

To a practical person looking out of a culvert such as this one, comes the suggestion of exceptionally great and economical digging ability or an Owen Bucket wouldn't have been selected.

To the contractor it recalls consistently good performance for years which has prompted him to reorder Owen Buckets year after year.

To the operator comes a reminder of how an Owen Bucket performs under varying difficult conditions, responding to his every demand and "stands up" with outstanding ability long after many buckets would have been relegated to the scrap heap.

"A mouthful at every bite"

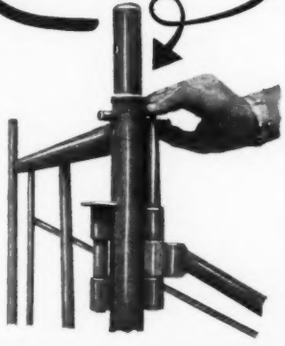
BUCKETS AND GRAPPLES
Write for Catalog

THE OWEN BUCKET CO.
[illegible] Breakwater Avenue • Cleveland, Ohio
Branches: New York, Philadelphia, Chicago, Berkeley, Calif.

Easier-Faster New SPEEDPIN Scaffold

Obsoletes All Other Types of Scaffolds

THE SPEEDPIN CONNECTION *Makes the Big Difference!*



• Here's the newest, safest, most efficient scaffold on the market today. The Hagan Speedpin Tubular Steel Scaffold goes up fast . . . is easy to erect . . . cuts job costs because of its simple basic design, unusual flexibility, and great strength. With all-welded construction throughout, it has no loseable parts or pins—gives you easier, neater storage and stacking.

Write today for descriptive literature and name of nearest dealer.

HAGAN TUBULAR PRODUCTS
P. O. BOX 2272 . YOUNGSTOWN 4, OHIO

Safety Engineering Can Be Operated on Business Principles

By J. A. De Luca
Safety Supt., Construction Division
E. I. du Pont de Nemours & Co.

Safety is operated in the Construction Division of E. I. du Pont de Nemours & Co. like any other good business. At all times, the Division knows: cost, performance, schedules, planning, and results.

For approximately 20 years, the company has pursued the integration of safety into all its field-construction and administrative work to the highest known degree. The work has varied from heavy construction of new plants for du Pont's own commercial interests to very great projects built in the interests of the Government and employing up to 45,000 men. Irrespective of the size or scope of the project, financially or in manpower, and irrespective of the end products on either commercial or Government work, all safety engineering has been done in the same way, using the same techniques with a relatively constant favorable result.

One general objective from the economic standpoint has been to create understanding and appreciation of the company's methods and techniques, so that insurance carriers and brokers would be influenced to insure the du Pont activities on a progressively improved performance rating. The average workmen's-compensation insurance rate for 12 to 15 different construction crafts in heavy construction throughout some 20 states has, from 1940 to 1950 inclusive, approximated $5.25 per $100 of payroll based on the "Manual of Rates".

Safety is largely a matter of reminding and educating. On every du Pont project, every Monday morning, all foremen meet with their respective gangs for a safety discussion. Prepared material is supplied to foremen for these meetings.

Based on performance-rating discussion *prior to the conclusion of insurance contracts*, the du Pont Construction Division has consistently procured insurance coverage, where self-insurance was not permitted, at $2.00 per $100 of payroll. This represents 2 per cent insurance cost. In almost every case no insurance was procured from outside carriers or brokerage groups without provision for further rate reduction below 2 per cent when further performance was had on the same project. In addition, all insurance contracts provide retrospective considerations after service charges. Cited are two examples of the effect on insurance of proper safety management:

A commercial project in Texas, not self-insured by du Pont because of Texas laws, had a well known carrier who, after considering du Pont's insistence on a performance rating, condescended to a rate of $4.80 per $100. This rate represented that insurance carrier's maximum interpretation of the possible effect of the safety engineering done by the du Pont Construction Division. When, after a year or more, the carrier, from his own experience with the company's safety engineering, had been in a position to find out what du Pont Construction calls "accident-prevention technique", that insurance carrier volunteered a 43-cent rate in place of the $4.80 rate.

Another example, not on a commercial project but on the largest Government project ever built, and having to do with so recent a date as January, 1952, has, in the same way as the example above, experienced a rate reduction from an original performance rating of $2.00 to 76 cents per $100 of payroll with an abundance of reserves held. To the Construction Division's knowledge, after the reserves are held sufficiently to cover limitations of the law, the rate will actually be 22 cents per $100 of payroll.

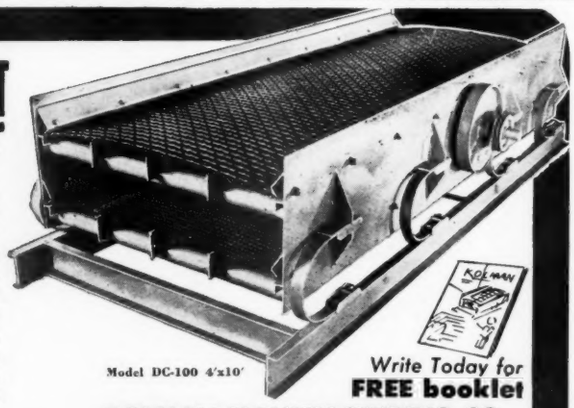
Workmen's-compensation insurance rates vary by crafts from less than $1.00 minimum to over $40 maximum per $100 per payroll, under any and all conditions. Though it is practical to think about rates in terms of what the average contractor spends for insurance, with or without safety, averaging the rates and the contractors in the current general-construction business would probably limit the scope to between $2.50 and $6.50.

The foregoing implies that if accident-and-loss prevention is followed, as it can be and has been in a few cases, many other contractors have the possibility of reducing that segment of their overhead insurance cost which is below 6 per cent, to less than 1 or 2 per cent. This particular consideration involves a majority of the 15,000 contractors in the United States at this time.

KOLMAN
VIBRATING SCREENS

Action — vigorous action designed to give high capacity and more accurate sizing — action that prevents "blinding" or clogging — yet "floating" action that prevents transmission of damaging vibrations to attached equipment. That's what has made KOLMAN the screen in the construction business!

KOLMAN Series "C" screens (shown at right) are available in a wide range of sizes in single, double and triple deck models. Their compact, rugged construction results in a minimum of repairs and time loss. Before you buy any vibrating screen, investigate the advantages of a KOLMAN!



Model DC-100 4'x10'

Write Today for FREE booklet

KOLMAN MANUFACTURING CO.
4922 W. 12th St. Sioux Falls, S. D.

Aluminum-Covered Plywood Is Used at Arctic Air Base

The differences between the coefficients of expansion in wood and metal have created a problem for years in the construction industry—how to keep the two materials glued together under wide temperature changes? Thule Air Base, Greenland, may provide an answer.

Recently, 15-million feet of Armorply, an aluminum-covered plywood manufactured by the United States Plywood Corp., New York, N. Y., was used in the construction of hangars, barracks, warehouses, and other buildings at Thule. Two men equipped with large wrenches erected durable and sturdy structures out of the weather-resistant modular panels. The buildings themselves are refrigerator-like in construction and highly insulated to protect men and materials from the extreme cold and dampness of the Arctic region.

HEAVY-DUTY TRENCHER
WITH NEW IMPROVED SELF CLEANING BUCKET — Capacity ½ yd.

A heavy-duty trench digger, which is designed for a wide variety of trenching for any highlift tractor with hydraulic bucket control.

It will increase the tractor's production from 30 to 50 per cent and is easily attached by one man in 15 minutes.

The Whitestown trencher is equipped with a ½-yard standard bucket. Special buckets, made to individual specifications, may be obtained. It will dig to a depth of 8 feet and dump at a height of 12 feet. This trencher has been in constant use for four years, and has proved to be rugged and satisfactory in ev ery way.

• *Immediate delivery can be made.*

The Whitestown Trencher is now available for use on the following hydraulic controlled tractors:
Allis-Chalmers HD-5G equipped with TS-5 tractor-shovel
Caterpillar D-4 and Trackson HT-4; Oliver with 4-A Lull loader
International TD-6 & TD-9 equipped with new Bucyrus-Erie dozer-shovel
International TD-8, TD-9 & TD-14-A with Hough bulldozer-shovel
Hough Model HM-Payloader; Trojan Loadster, Models LM-75; LC-100-B

• *Please specify make of tractor.*

WHITESTOWN TRENCHER CO., INC.
Wood Road, Whitesboro, New York — Phone: Utica 6-2430

Jobs Done Quicker, Cheaper

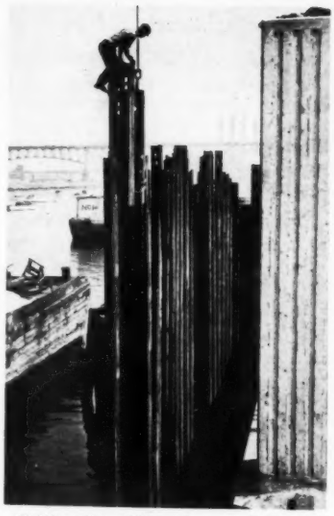
Attached to Tractors, Bulldozers, Motor Graders and Scrapers, the Automatic Slope-Meters are in use on the construction of highways, airports, dams and building sites. Slope-Meters are compact, sturdily constructed instruments that will automatically show the operator the exact grade or slope on which he is working.

Order from Your Equipment Distributor Today
OR
THE SLOPE-METER CO. EXCELSIOR, MINN.

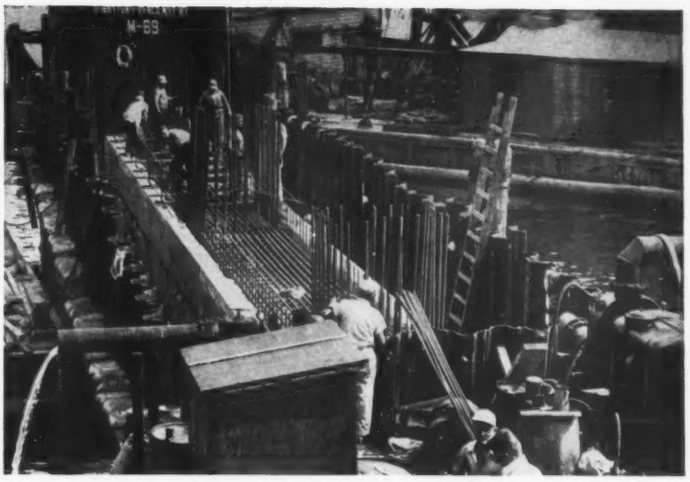
Bridge Uses Thirteen Sheet-Pile Cofferdams

Thirteen steel-sheet-piling cofferdams are being used in the construction of a 6-lane lift bridge which replaces a 4-lane bascule bridge where Route 25 crosses the Hackensack River in South Kearney, N. J. Nine 30 x 95-foot cofferdams are being used for the approach piers; and four 50 x 60-foot ones for the lift-span piers.

The same construction procedure is being followed for all of the piers. After the area had been dredged to an average depth of about 15 feet below the bed of the river, the bearing piles are driven. Timber sheets are used for approach piers and steel piles for lift-span piers. Steel-sheet piling is then driven for construction of the cofferdam. The latter is braced by means of a steel wale with timber bracing. After tremie concrete is poured, the cofferdam is pumped down and forms are erected for pouring reinforced-concrete bases and columns for bridge girders.



Pulling the piling of one of the 13 cofferdams used on the 6-lane lift bridge across the Hackensack River in South Kearney, N. J.



Closeup of cofferdam for one of the approach piers, showing the reinforced-concrete base for the bridge girders. The protruding reinforced steel bars indicate the location of the three columns, forms for which had not been erected when the picture was taken.

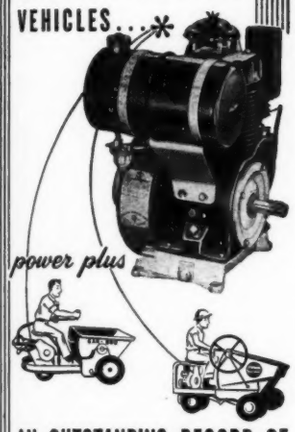
Concrete is mixed on a floating mixer, hoisted to the top of the mixer tower, and poured into the form through the counterweighted chute. The bases are faced with a protective veneer of granite within the tide level.

To provide a stable foundation for abutments, which are located about 100 feet north of the existing bridge, mud on the river bottom was dredged out until a hard level was reached, and a new fill dumped in its place to the required height (25 feet above the level of Route 25). To facilitate removal of the dredged mud, it was pumped through pipelines to a site in Jersey City. Because the abutment-construction area adjoins Route 25 on the west bank of the river, a steel-sheet-pile retaining wall had to be used. First, the piling was driven deep to retain the bank while the river bottom was dredged. After the bottom was refilled, the piling was pulled to a height of approximately 30 feet above road level to prevent the 25-foot-high fill from spilling over on the highway.

The substructure is being constructed by J. Rich Steers, Inc., under contract to the Bridge Division and Road Division of the New Jersey State Highway Department. L. B. Foster Co. supplied the steel-sheet piling.

The bridge will be open to traffic this winter.

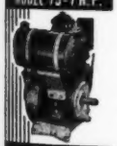
GLADDEN ENGINES NOW OPERATING OVER 3000 MATERIAL HANDLING VEHICLES...*



AN OUTSTANDING RECORD OF TROUBLE-FREE PERFORMANCE

"We are using Gladden engines exclusively on our material handling units because of their universally accepted dependability and powerful performance," says the Vice-President of one of the leading manufacturers of material handling units.

Strong, reliable and inexpensive to operate, GLADDEN'S series of single cylinder, air-cooled, pretested engines find real usefulness in every construction application.



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Timken Main Bearings

Automotive Type Connecting Rod Bearing Inserts (Models 50 & 75)

Meehanite Cylinder Castings

Pressure Cast Aluminum Head

Oil Bath Air Cleaner as Standard Equipment (Models 50 & 75—Optional 40)

Generous Fin Area Insures Maximum Cooling

GLADDEN ENGINEERS WILL ADAPT THESE ENGINES TO SPECIAL INSTALLATIONS OR REQUIREMENTS UPON REQUEST...

For further information write

GLADDEN PRODUCTS CORPORATION

NOW IN THE 33rd YEAR OF ENGINE BUILDING

635, Dept. 100, West Colorado Boulevard Glendale 4, California

SAMSON BAR CUTTERS

- All Steel Construction
- Unbreakable Frame
- Easy Operation
- Immediate Shipment

Write for catalog of Metal Working Equipment

CAPACITY	No. 20	No. 23	No. 26
Rounds	⅝"	¾"	⅞"
Squares	½"	⅝"	¾"
Flats	2"x¼"	2½"x5/16"	2½"x⅜"
PRICE	$47.15	$63.00	$72.00

f.o.b. New York, subject to change

JULIUS BLUM & CO., Inc.
Established 1910
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For *Extra* Fast Easy Smooth Pipe Threading Choose RIDGID

Work-Saver Die Stocks

JAM-PROOF 65R

Perfect threads on 1" to 2" pipe with 1 set of 4 high-speed steel dies—sets to pipe size in 10 seconds. Lead screw on barrel won't jam on workholder—drive plate automatically kicks out driving pawl. Self-centering workholder sets instantly!

4P GEARED THREADER

For 2½" to 4" pipe. Balanced loop handles—easy to lift 4P where you want it. Mistake-proof workholder sets to size before put on pipe—1 set screw. Safe enclosed gear. Practically no upkeep. Special 4P for conduit.

OOR RATCHET THREADER

For ⅛" to 2" pipe. Heads snap into ratchet ring from either side, won't fall out. Precision-cut alloy dies reverse for close-to-wall threads. 00R and 0R, ⅛" to 1"; 111R and 11R, ⅛" to 1¼"; 12R, ⅛" to 2". Conduit dies, too.

EXTRA VALUE

RIDGID's are famous for efficient design, smooth performance, rugged durability. Every die stock factory tested. For top value for your money, buy RIDGID threaders from your Supply House.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO

RIDGID Work-Saver Pipe Tools

Masonry-Drill-Bit Leaflet

A leaflet on masonry-drill bits has been prepared by New England Carbide Tool Co., Inc., 60 Brookline St., Cambridge 39, Mass. It describes and illustrates the Cyclo-twist and Cyclo-Core rotary-drill bits and the Thunder-twist and Thunder-Core hammer bits.

The leaflet includes a guide for choosing the right bit for each job. The guide is divided into three sections: soft or medium, hard, and extra-hard masonry. Each section gives hole diameters and recommended bits.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 851.

New Reflector Cape For Traffic Directors

A new Scotchlite cape for men who direct traffic is offered by Industrial Products Co., 2855 N. Fourth St., Philadelphia 33, Pa. Made of close-woven white canvas with silver reflective strips on front and back, it may be worn closed or with the bottom corners snapped back to allow the cape to move with the arms. It fits any size man, with or without topcoat; therefore no size measurements are necessary when ordering. The cloth is sanforized and may be laundered without shrinkage.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 951.

New Safety Goggle

A new plastic safety goggle is available from United States Safety Service Co., 1215 McGee, Kansas City 6, Mo. The Saf-I-Flex has a newly designed frame of pliable Vinyl with rolled

edges where it contacts the face and a grid ventilation which makes the goggle comfortable and entirely fog free, the company says. The clear frame permits full side vision.

The lens can be easily and quickly changed. It locks securely into the frame channel at 7 different points and is optically correct. The company claims that the Saf-I-Flex offers full protection from all impact hazards. It will fit over even the widest-type personal glasses and because of its lightweight (1.7 ounces) is very comfortable.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 873.

The Standard For Reliability And Durability

1852 1952

VULCAN IRON WORKS CHICAGO·U·S·A

for 100 years

Manufacturers of Pile Driving Hammers and Pile Extractors

VULCAN IRON WORKS • 329 NORTH BELL AVENUE • CHICAGO 12, ILL.

SELF-PRIMING CENTRIFUGAL PUMPS

RICE

Engine, belt and electric driven pumps with many new features to give you outstanding performance at low cost. A.G.C. rated. Write for special bulletins.

RICE PUMP & MACHINE COMPANY
220 N. 12th Avenue, Grafton, Wisconsin

COMPARE!

STERLING Hydraulic Control EARTH BORING MACHINE

DIGS HOLES SETS POLES

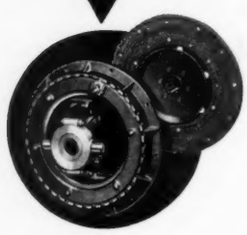
EASIER! FASTER! CHEAPER!

Under hard digging conditions "STERLING" has proven itself worthy of its name. Maintenance costs are at a minimum and Swing Mount, Turn Table, & Fore and Aft hydraulically controlled mountings save time in locating stakes. Auger sizes from 10" to 26" are standard and depths to 7½ ft., 9½ ft. and 14½ ft. are available . . . . .
Dig your holes the hydraulic way -- Ask any Sterling owner -- Ask for a demonstration.

WYOMING VALLEY EQUIPMENT COMPANY

1089 WYOMING AVENUE
FORTY FORT (Wilkes-Barre), PA.
Phone Kingston 7-6400

Smooths The Way



To Better Roads

The GALION Three-Wheel ROLLER has to be extra rugged, sturdy and dependable to keep on rolling up profits for it's owners. ROCKFORD CLUTCHES help it serve day-in-and-day-out with minimum maintainance cost, under most severe working conditions. Let ROCKFORD clutch engineers help specify heavy-duty power transmission controls for your machines.

ROCKFORD CLUTCH DIVISION BORG-WARNER
314 Catherine Street, Rockford, Illinois, U.S.A.

B-W ENGINEERING MAKES IT WORK

B-W PRODUCTION MAKES IT AVAILABLE

ENGINEERING BULLETIN SENT ON REQUEST

ROCKFORD CLUTCHES

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Portrait in Print

By RAY DAY

A Mighty Mole With a Mission: Paul C. Guinn, or "The Bunyan"

• "BY the way, where's the old Bunyan now?"

Visit a tunnel job anywhere west of the Mississippi River, sit during a smoke period with a crew of tunnel stiffs, and sooner or later if you know tunnel men the question will be asked. Tunnel stiffs are the hardest most profane men still kicking around in the construction business, but when they speak of "The Bunyan" there's respect in their voices. Without knowing who it is they're talking about you soon get the idea that The Bunyan certainly must have made deeper impressions on the tunnel business than most of his kind.

With just a little knocking around you can find presidents of construction companies who have called on The Bunyan to help estimate the tough ones, where tunneling was the main problem. You can find walking bosses who speak of legendary feats of organization and daring this man has pulled. You can find safety engineers who speak in awe of this man who has worked a total of 60 tunnel headings in his lifetime without killing a man underground. You can find records of conferences where plenty of high-priced engineering talent listened to what The Bunyan had to say. You can find tunnel stiffs he has helped, and you can find those he has fired.

The latter will tell you, "Sure, I know The Bunyan. He's the meanest old son of a bitch on earth. Copenhagen snuff has poisoned the old devil."

The former will tell you, "He's just like all his breed: hard as hell, but fair. Listen to him and you'll learn something."

The man they're talking about is Paul C. Guinn: tunnel man, superintendent, project manager, contractor, master mechanic, mucking-machine operator, and diplomat all rolled into one package. The package is usually dressed in what Guinn likes to wear: faded old canvas jacket, wool shirt, nondescript pants, and boots to match. The doctor recently forbade him to use Copenhagen, but in the pocket of his wool shirt is a suspicious-looking round bulge, and the tin can cuspidor he carries in the front seat of his automobile doesn't exactly seem to jibe with the doctor's advice.

Guinn is one of the men who, under Frank Crowe, master-minded the big tunnels at Boulder Dam. Just recently he pushed the tunnels through at Lucky Peak Dam, near Boise, Idaho. He is the man who battled the water on some of the Metropolitan Water Aqueduct work in southern California, and who pushed a 3,600-foot tunnel through under the Yakima River at Ellensburg, Wash., to whip one of the toughest siphon problems ever attempted in the northwest.

When CONTRACTORS AND ENGINEERS MONTHLY caught up with The Bunyan most recently, he had just finished another one safely. It was a 7,000-foot railroad bore for Kennecott Copper Corp. in the Bingham Canyon mine. Directly overhead was another tunnel the old master had ramrodded in 1937.

The Bunyan is over 60. His hair is gray. But he is still lithe, lean, and quick as a cat. His eyes are still bright and hard behind the glasses he now wears. His voice one minute has warmth and vibration. The next minute, particularly when something looks sour, it turns into the tough deep growl tunnel men know so well.

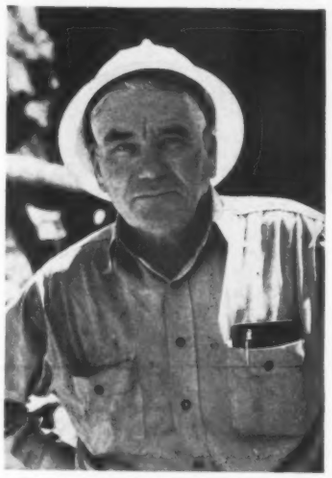
Has Saved Many a Man

Paul Guinn's growl has probably saved more lives than many safety programs. When Guinn is concerned or angry, his voice has a peculiar penetrating quality which has the ability to scare a man stiff. Long before safety programs ever got started in the construction business, Guinn was running safe jobs on the strength of his intuition, his eyes, and his voice. When the miners hit a tough spot on the recent Bingham job and it called for some delicate breastboarding, Guinn's angry roar of warning sent two men scuttling away seconds before part of the wall caved down.

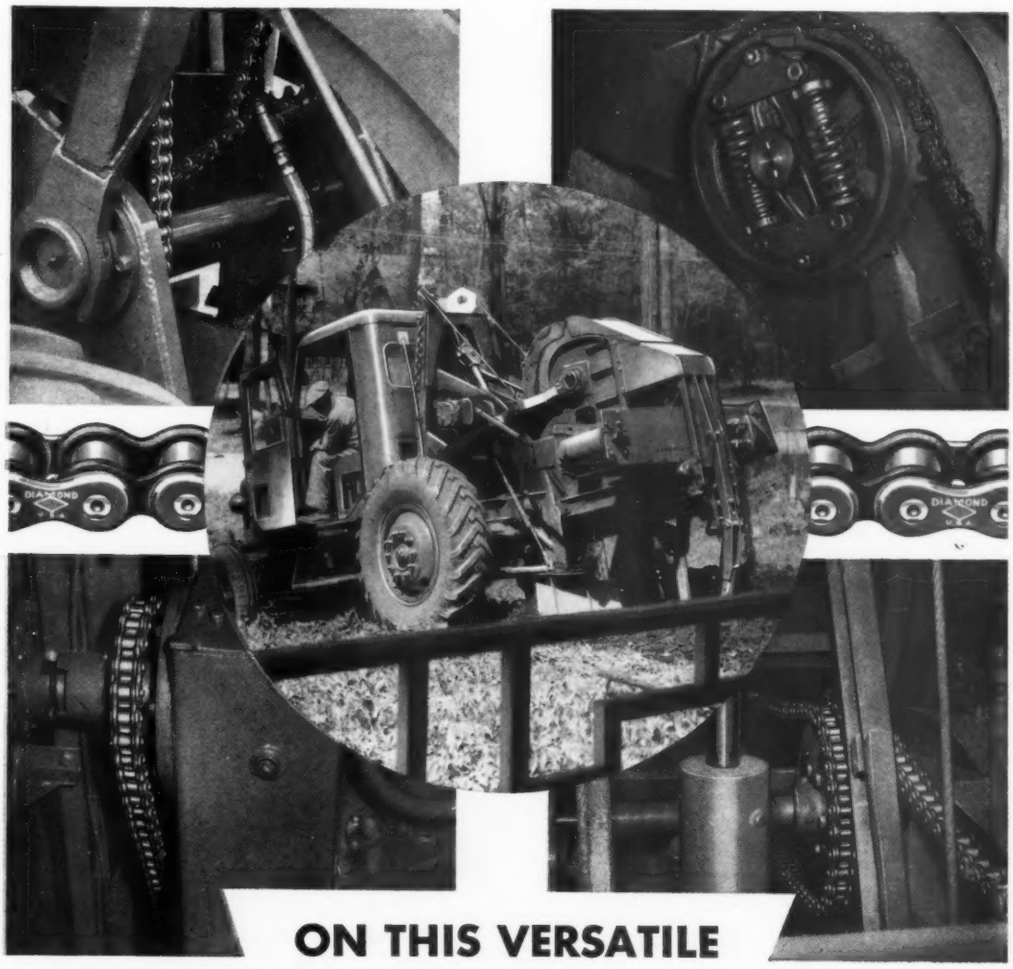
There have been accidents on some of Guinn's jobs, but possibly the greatest source of pride to him is the fact that he's bossed 60 tunnel headings—and a heading is a tunnel to a tunnel stiff—without getting a man killed underground. A couple of electrocutions outside the tunnel marred what would otherwise have been a perfect record.

Electricians who hire in on a Bunyan job soon find they know nothing about The Bunyan's type of tunnel electricity. When one of Guinn's crews goes to work, one of the first things they learn is that smoking will not be tolerated when the powder comes in. Electric lights are cut off by a master switch. The powder is loaded with the aid of a single big spotlight, absolutely grounded to prevent an arc. If Guinn ever caught a powder man leaving spare exploders or powder in the tunnel he'd fire him on sight. Possibly his willingness to do these unpleasant

(Continued on next page)



P. C. Guinn, alias "The Bunyan," is as tough as most of the tunneling jobs he undertakes. This was taken on one of his latest, at Lucky Peak Dam, Idaho.



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DIAMOND ROLLER CHAINS

Mole With a Mission: Tale of a Tunnel Man

(Continued from preceding page)

things is part of the secret of his success.

Guinn's growl is still a mighty effective safety device, too. When he starts a tunnel, the old man gathers his gang together for one of his rare speeches. It usually starts off, "Now listen, you guys", or with such other endearing terms as "knuckleheads" or worse. The gist of Guinn's opening speech is that "we're going to drill a tunnel, boys, and by God we're going to finish on time. But you'll never find me rushing you if conditions are dangerous, and when we finish this thing, I wanta see every damn one of you guys come walking away under your own power. Now what the hell are you waitin' on, let's go."

Guinn has that indefinable something which makes his words stay with a man. And the men don't get angry. The Bunyan is one of those men who can speak what's on his mind without ruffling others.

Likes His Men

Like all those old-timers who came up in the construction business during its roughest years, Guinn's front is a masquerade for a genuine love for his men which is simple and strong. One way it shows up is in his concern for their safety. But there is something else the old master has been worrying about in recent years. It is the decline of pride and craftsmanship on the part of some of the younger construction men who are getting into the business. It is something he will not talk about, except to very close friends. He has certain definite ideas about the cause of this sad phenomenon, but criticism or censure is not in his book. If Guinn is a man with a mission, that mission is to re-instill the old-time construction spirit into the minds of men who work on his jobs. Characteristically, the only way he knows how to do it is the sound way: by example.

It's a standing order on The Bunyan's jobs that he's to be called whenever sudden danger and emergencies arise. He alone is the judge of that danger when he arrives, and he's an expert. If there is danger to human life, it is Guinn who leads the way doing whatever is necessary to remedy the situation. He delegates authority, he backs his men to the limit, he's always on time for work, and he never hesitates to use an axe if one is needed. A hoisting engineer who made his second miscue in a morning found that out recently.

"I get to thinking, sometimes, about the marvelous advances that have been made in tunnel machinery in the last 35 years", Guinn explains. "Look at these modern drills; modern mountings . . . better compressors and more comfortable working conditions. If the old-time human fire, integrity, and the willingness to learn by working hard had kept pace with these mechanical improvements, there's no telling how much further this nation might be advanced today."

To Guinn, this idea seems so basic and sound that it sometimes embarrasses him when people pick on him to illustrate the opportunities for young men. In front of a gathering recently, an engineer who envied but couldn't understand Guinn's knowledge of tunnel engineering on the basis of The Bunyan's elementary education, said, "But Mr. Guinn, it's impossible for you to have as little formal education as you say you have. My word, how did you ever get out of school?"

The Bunyan arose, and with a merry twinkle in his eyes, began to explain. "I got as far as the sixth grade", he said, "and there I stayed, hung on center. I had been in the sixth grade so many years that one day I decided I ought to be promoted to the seventh. I went up to the teacher and asked her when she thought I'd graduate. "She looked me over and said 'Paul, you are so stupid dumb the only way I can graduate you is to marry you'. So we got married, I graduated, and all this intelligence you think I have now I developed on a sort of post-graduate basis."

There is a thread of truth in that story. Mrs. Guinn, whom The Bunyan met and married in Salt Lake City in 1917, was a nurse and an exceptionally fine girl. She has done much for the old master of tunnels. Who knows, perhaps Guinn's safety complex resulted from wanting to get home under his own power himself?

Guinn delights in ridiculing pretentiousness in any form. At a somewhat more than erudite mining meeting not long ago, he was asked to describe the methods he used to shoot the longest round he ever pulled. After an elaborate buildup of being broke and desperately needing a job, Guinn told how the owner of a highgrade gold mine gave him a job. Deadpan, The Bunyan explained that the main shaft was 30 feet deep with lateral tunnels at three levels.

"My word!" exclaimed the mining experts, impressed. "Three levels on a 30-foot shaft. Incredible!"

"Well, this owner, Mr. Wilson, he gave me orders that night on the graveyard shift to shoot at the moon, but if I struck it rich to call him immediately. He was worried about highgraders who had been stealing from him. We pulled the shot about 2 a.m., and as soon as the smoke cleared, I went down. Sure enough, there she was right above

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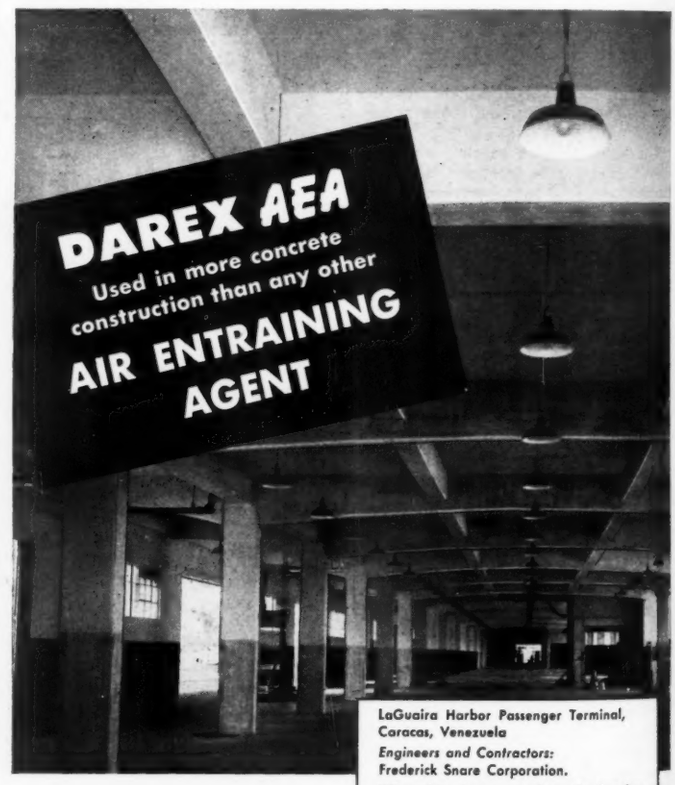

LaGuaira Harbor Passenger Terminal, Caracas, Venezuela

Engineers and Contractors: Frederick Snare Corporation.

When this photo was taken, the first bay had been painted, others had not. Note the smooth-as-plaster texture of the painted DAREX AEA concrete!

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me, gentlemen, big and round and shiny, with gold specks scattered all around. I called Wilson immediately."

"And Wilson? Did he reward you?"

"Reward hell. He fired me on the spot."

"In heaven's name why?"

"I couldn't figure it out either", Guinn shot back. "I had done exactly what he told me to . . . shot at the moon. In fact, I had blown up the whole 30-foot shaft, three levels and all, and it was the moon and stars we were looking at!"

Lauds Tunnel Advances

The advancement and improvement of modern tunnel equipment never ceases to impress Guinn, who is one of the machinery manufacturer's best salesmen. He will try anything new; all he asks is that it do the work better and cheaper than conventional methods. The development of better drill mountings, safer explosives, and dependable delays are all-important to the tunnel business, he believes. These improvements have allowed tunnels to be built in places prohibitively costly before.

Guinn has been unusually successful in working with engineers in tunnel planning. Just as the men at the mining gathering were far from angry when he told them about his biggest round, engineers listen carefully to this man who has lived a lifetime in tunnels. He has shown a few of them how to save money. The Bunyan is a great believer in good engineers, too. His present Project Engineer is Charles Hageman. "Charlie has been absolutely invaluable here", he says. "The man is brilliant. How I wish I could design stuff as foolproof as that man turns out!"

Biography

Guinn was born at the Buchanan Mine, Tuolumne County, Calif., March 2, 1890. He completed grade school at Sonora, Calif., in 1905, and spent six months of his next year fighting the San Francisco fire and cleaning up the resulting debris.

At 17 years of age, he logged and mined at Placerville, Calif., and at 18 he was braking on logging trains. This he continued until 1910, when he braked on the Southern Pacific from Truckee to the Donner Summit. When he won a free pass and $40 to the Jeffries-Johnson prize fight in 1910, he attended the fight and lost the $40 in a crap game.

Turning from railroading, he first started tunnel work and mining at Sutter Creek and Jackson, Calif., earning his first shift-boss job at the Amador Queen Mine. "Some of the young fellows nowadays want the same job with only 2 weeks' experience", Guinn says. After two years, he joined Stone and Webster's construction outfit on the 2,000-foot Huntington Lake tunnel in the Fresno area. Then he did his first contracting—driving two tunnels and sinking a 300-foot shaft.

Back on mining in 1914, Guinn was a shift boss in the Hummingbird at the Burke mine in the Coeur d'Alene section of Idaho. In 1915 he was at Butte, contracting tunnels and shaft sinking in the Speculator shaft under the richest hill on earth.

In Utah in 1917, he contracted a 600-foot tunnel at the Emma silver mine at Alta, then became foreman of No. 1 Combined Metals mine at Pioche, Nev. In 1918 he drove a 900-foot mine tunnel at Grass Valley, Calif. The next two were spent contracting and as foreman at the Walker copper mine in California.

Guinn's first big railway-tunnel foremanship came under veteran old Hank Lawler of the Utah Construction Co. on the 5,000-foot Summit Tunnel on the Southern Pacific, in California. Ben Arp, Sr., was foreman on the opposite heading.

The years 1925-26 were spent driving mine tunnels on the Comstock lode, Virginia City, Nev., and as shaft and tunnel contractor at Superior, Ariz. He then took on a superintendent's job over 7 headings, involving 17,000 feet of water tunnel in the Lafayette area of California, for the Metropolitan Water District. Coolidge Dam, the 11,000-foot Valley Springs tunnel in California, and the Yakima River job followed in rapid order. The Ellensburg job, calling for 3,600 feet of tunnel 165 feet under the riverbed with 500 feet of siphon-barrel leg on a 45-per-cent slope on either side, was the worst one he ever tackled. The basalt rock was badly fractured and waterlogged, and the job took years out of Guinn's life.

There is no need to amplify the importance of Guinn's superintendency, under the late Frank Crowe, of Six Companies' tunnel work at Boulder Dam in 1931-32. This work was followed by driving the West Eagle and Monrovia tunnels on the California

(*Concluded on next page*)

Guinn points out a tricky spot of shoving ground to visitors P. E. Moss (left) and Lefferts Hutton, both of Goodall Rubber Co., whose products were used on this 7,000-foot railroad bore for a copper mine.

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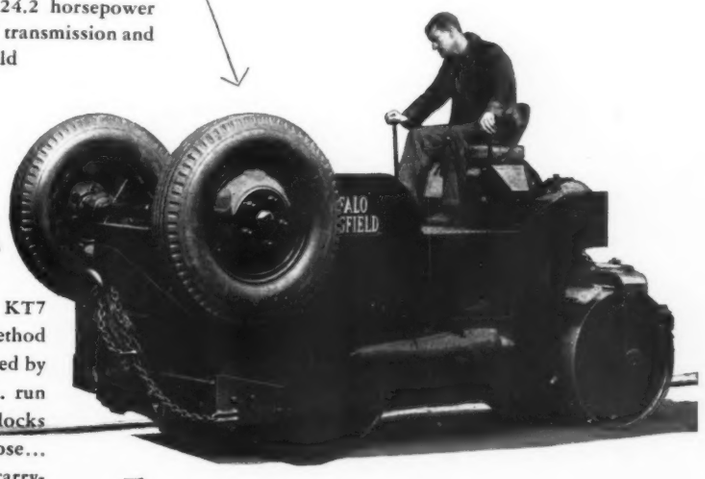

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Mole With a Mission: Tale of a Tunnel Man

(Continued from preceding page)

aqueduct for Dixon, Bent, and Johnson. He drove the tunnels at Horse Mesa Dam in 1936, and did the Bingham tunnel 200 feet above the 1952 job in the same location in 1937.

In more recent years, Guinn did the railroad tunnel at Shasta, Calif., for Colonial Construction Co., the 18,000-foot total of tunneling on the Draper, Alpine, and Olmstead tunnels of the Deer Creek Project in Utah, 5.000 feet of mine tunnel at Questa, N. Mex., a tunnel-reconditioning job on the Moffat branch of the Denver & Rio Grande Railroad, and 2,000 feet of mine tunnel for Calera Mining Co. in Idaho.

In 1946 Guinn supervised a 6,000-foot water tunnel for L. E. Dixon at San Diego (see C. & E. M., March, 1947, pg. 17) and in 1947 a 5,500-foot hydro-electric tunnel at Roseburg, Oreg., for Oregon Power Co. In 1949 he had charge of driving the Lucky Peak tunnel at Boise. It is small wonder with a record of accomplishment like this that Guinn has come by his trade name of "The Bunyan".

Guinn lives comfortably today at Draper, Utah, where he halfway follows his doctor's advice to give up Copenhagen, whiskey, and starchy foods. Guinn's only hobby is hunting deer, birds, and elk, and fishing. He and Mrs. Guinn have four daughters: Loretta, Fern, Norma, and Pauline. They are all married; all are well educated and talented. Fern, for example, is a 1943 graduate of the Latter Day Saints' Hospital of Nursing. Pauline's husband flies a Western Airlines plane into Salt Lake City regularly.

Many of Guinn's former proteges today are superintendents high up in the tunnel business. Some are dead. Some have gone berserk. It seems to be an occupational hazard in the tunnel profession. But the grizzled old Bunyan, who has very much of a contemporary outlook, is somehow reminiscent of earlier and more hectic days when the names of such men as Galloping Whitey Martin, Jack Casey, Danny Daggs, Joe Scholz, Leonard Barry, Ross Eddington, Woody Williams, and others were current in the tunnel business.

Advice to Young Men

"What advice would you like to pass on to young engineers and other young men entering the construction business?" we asked The Bunyan. And his answer, profane as it was, seemed to be the closest thing to his heart of any part of the interview.

"Urge 'em to learn to love hard work, and the fun that comes with personal accomplishment. Tell 'em to stand on their own two feet and learn to make their own decisions, even if they get their nose bloodied once in a while. Tell 'em to start doing some of their own thinking, instead of swallowing the canned propaganda they're taking. Tell 'em there isn't a damn thing wrong with this nation or their own personal fortunes that a return to hard work won't cure."

The Bunyan was getting steamed up. He walked over to the washbasin in a corner of his field office, poured out some of the vitamin pills his doctor had prescribed, and scooped up some water in the palm of his hand for a chaser.

"Who am I to be giving them advice?" he grinned. "Let 'em learn the hard way. That's the trouble with 'em now: they're getting everything too easy . . . even advice. And it isn't helping the boys any."

Missouri Flood Damage Less Because of Pick-Sloan Plan

A major chapter of destruction in Missouri Basin history was written last April when the Missouri River split her seams to the tune of an estimated $179,000,000 worth of damage. According to Brig. Gen. W. E. Potter of the Army Corps of Engineers, Missouri River Division, however, the completed flood-protection works of the Pick-Sloan program prevented an additional $238,580,000.

The flood had its origin in a winter snow blanket covering over 80,000 square miles in the Dakotas and Montana, but the disaster extended all the way through Missouri. This state had a damage total of $53,842,000—a higher figure than that for any of the other six states affected. Field surveys of the Corps show that agricultural damage exceeded all others, but only because flood works completed by the Army Engineers at Omaha, Nebr., Council Bluffs, Iowa, Kansas City, Mo., and Kansas City, Kans., kept the waters out of those municipal areas.

The staggering possibilities of what might have happened emphasize the soundness of the flood-control program (authorized by Congress in 1944) and the urgency of its continued progress on uncompleted units.

Bulletin on Woodworking

"Saw Tips," a bulletin on woodworking, has been re-issued by DeWalt, Inc., of Lancaster, Pa., after an absence of almost a year. It begins again with a discussion of heavy-timber cutting. In succeeding issues, the bi-monthly will focus on problems of specialized industries, but will also provide general information.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 952.

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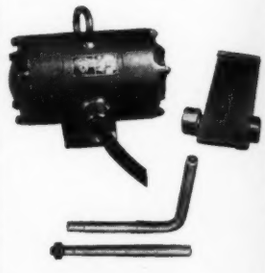

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Two double-acting hydraulic cylinders cushion the platform when it is tilted with or without load. Two chains keep the cylinders from becoming overextended. When the platform lock is released, one man standing on the end is sufficient to tilt the platform into loading position. The platform width is 96 inches and the length varies from about 19 feet to 21½ feet, depending on the model.

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Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 872.

Booklet on Company History

A 36-page pocket-size booklet presenting a brief history of the company, its plants, and products has been published by Ingersoll-Rand, 11 Broadway, New York 4, N. Y. Entitled "Our Latchstring Is Out", the booklet illustrates rock drills; air and electric tools and hoists; air and gas compressors; gas and diesel engines; centrifugal blowers; centrifugal and propeller pumps.

A little anecdote about Simon Ingersoll and the origin of the first practical steam rock-drill, in 1871, appears on the back cover. Many other Ingersoll-Rand developments are shown as milestones of progress.

This literature may be obtained from the company by requesting Form 300, or by using the Request Card that is bound in at page 18. Circle No. 874.

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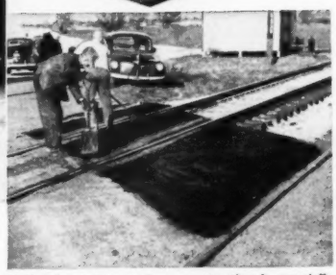

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WHEREVER you find gasoline powered equipment doing the job better, faster — invariably the power is Briggs & Stratton. These single-cylinder, 4-cycle, air-cooled gasoline engines are leaders in the field and preferred for dependable power the world over. Briggs & Stratton Corporation, Milwaukee 1, Wisconsin, U. S. A.

In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.

Races High Water to Rebuild Bridge Piers

Air Tools Help Contractor Meet Deadline: Piers, Abutment, For Zanesville RR Bridge Completed in 3 Months

• BY the narrowest of margins, George E. Detzel Co., Cincinnati, Ohio, beat the rising waters of the Muskingum River last year. The job was to rebuild three concrete piers and an abutment for a 580-foot railroad bridge at Zanesville, Ohio, and the contractor started work on August 22, 1951, and finished on December 1. On December 2, the river inundated the last of the four cofferdams.

The three stone piers which had originally supported the steel span had been badly damaged when the bridge was washed out in the flood of 1913, and, when rebuilt, their bases were encased in concrete. Since then, however, the swift current of the Muskingum had eroded the piers. When work started on August 22, the contractor discovered that the footing of one pier had been almost completely washed away. Detzel's problem was to repair the three piers and the east abutment before the usual rainy season raised the river level and made work impossible. Project Superintendent Ollie Privett met the deadline by using as much manpower and equipment as could be efficiently employed. Once a cofferdam was pumped out, as many as 40 men were put on the job on a three-shift basis.

Rock Foundation Solidified

Starting on the westernmost pier, in relatively shallow water, the men first constructed a sandbag cofferdam around the pier and pumped it dry with air-driven Ingersoll-Rand sump pumps. With air-powered paving breakers, they next removed what remained of the old concrete collars and dug a trench 3 feet wide and 4 feet deep around the entire perimeter of the pier to reach solid rock. The rock beneath the trench was then solidified by pressure grouting to an additional 4-foot depth. Pneumatic jackhammers were used for this drilling operation and also to drill grout holes 6 feet into the stone pier every 5 feet around the pier and every 3 feet of elevation.

Concrete Placing, Reinforcing

On September 1, after dowels and reinforcing steel had been placed, concrete was poured for the footing of the first pier. A Pumpcrete machine was used to place the 49 yards of ready-mix concrete and two I-R vibrators were used throughout the pouring. Forms 10 feet high were constructed on the footing and on September 17, 127¾ yards of concrete was poured for the collar around the original stone pier at the rate of 15 yards per hour. The same equipment was used for all pouring operations. After setting for two days and removal of the forms, the new concrete was sprayed with a curing compound. The collar slopes down from the old stone pier and, at the joint between the two materials, a groove 1 inch wide and 2 inches deep was cut with air chipping hammers and filled with Careylastic.

The collars were anchored to the piers by 1-inch dowels which had been put into the grout holes in the stone piers during the grouting operation. The new concrete was reinforced with ¾-inch vertical steel bars tied to steel dowels in the pressure-grouted rock-bed. In addition, two staggered rows of ¾-inch deformed steel rods were placed horizontally with one row 6 inches from the pier and one row 6 inches from the outside of the concrete.

Footings and collars varied somewhat in size to meet conditions of water and riverbed. The largest (the eastern pier) required a footing 10 feet deep on the upstream end tapering to 5 feet downstream. The collar rose to 12 feet above the riverbed. The pier is 50 feet long and 10 feet 9 inches wide at the bottom and tapers as it rises.

A passing train overhead doesn't disturb George E. Detzel Co.'s men as they work on the concrete encasement of Zanesville Bridge's third pier. A Pumpcrete machine is putting concrete into the forms.

Cofferdams

The midstream pier required a 6-foot sandbag dam, which was pumped out with four air-driven sump pumps and two gasoline-engine-driven 4-inch pumps. The footing of 109½ yards was poured on September 26 and the 83-yard collar on October 3.

The eastern pier stands in water as deep as 12 feet and it was necessary to construct a wooden-framed cofferdam 100 feet long, 60 feet wide, and 12 feet thick. Twenty-six cars of fill were sent down two chutes into the dam from a work train on the bridge. An air-driven high-lift sump pump sent river water up 33 feet to wash the fill down the chutes and spread it. At the same time, pumps discharged water from the dam. After the preparation, which was essentially the same for all three piers, the footing was poured on October 21 and the collar encasing the pier on October 30. Total amount of concrete for this pier was 224½ yards.

Work on the east abutment started on November 5 with construction of a cofferdam, after which all loose and disintegrated rock supporting the abut-

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Pour or spray into air intake. Sure, quick starts. Save batteries. Save time. Save money.
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Platforms:
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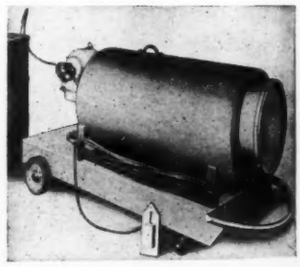

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7717 Grays Ave., Phila. 42, Pa.

Give To Conquer Cancer

ment was removed and the footing area excavated and cleaned out. It was found that the stones supporting the seat had been eroded to a depth of 2½ feet. The work of cleaning out the footing excavation had just been completed when the water rose and washed out half the cofferdam. Detzel rebuilt the dam and cleared the area out again. As in the case of the piers, holes were drilled into the rock, heavy dowels and reinforcing steel placed, and forms built. On November 17, a footing of 82½ yards was poured to complete the concrete work.

The complete job was cleaned up and the contractor had moved off by December 1. Heavy rains followed immediately, the river rose rapidly, and the last cofferdam was entirely submerged, thus saving the contractor the expense of removing it.

Superintendent Ollie Privett (center) and Carpenter Foreman Hobert Morris listen intently as Operator Victor Anderson explains the workings of the I-R Gyro-Flo 600 portable compressor which supplied the air for the Zanesville Bridge job.

Air Tools Speed the Job

Air tools and air power played an important part in the completion of this urgent project. Sump pumps for moving fill and pumping out cofferdams; vibrators for setting concrete; pavement breakers for removing old concrete and stone and for trench excavation; jackhammers for rock drilling and pressure grouting; and chipping hammers for cutting grooves, all helped to speed the job. In addition, Detzel used air drills for wood boring in the construction of dams and forms; an air grinder for dressing tools and making bolts; a multi-vane air motor to drive the grout mixer; and another for the Gunite machine. Compressed air for the entire project was supplied by a single Ingersoll-Rand Gyro-Flo 600 which incorporates a General Motors diesel driving an I-R rotary compressor. The latter delivers 600 cfm of air at 110 pounds. Though all the equipment depended on this single mobile compressor, the project was never starved for air.

Invitation to Bid

Sealed bids will be received in the office of Engineering and Construction Director, Panama Canal Company, Balboa Heights, Canal Zone until 10:00 A.M., E.S.T. December 9, 1952, for furnishing all plant, tools, equipment materials, labor, and services, and performing all work for the construction of 22 masonry type quarters, buildings and appurtenances at Balboa, Canal Zone and 123 masonry and off-the-ground type buildings at Corozal Townsite Construction, Canal Zone, for Panama Canal Company.

Copies of specifications, drawings, and bidding papers may be obtained from Purchasing Agent, Panama Canal Company, 24 State Street, New York 4, N.Y. Requests should be accompanied by a $40.00 deposit for each set of combined specifications with drawings. Deposit to be in form of a United States money order or a certified check made payable to "Treasurer, Panama Canal Company."

Specifications and drawings may be inspected at the following places:

Panama Canal Company
411 10th Street, N.W.
Washington 25, D.C.

Office of the District Engineer
U. S. Engineer's Office
180 New Montgomery Street
San Francisco 19, California

Office of the District Engineer
U. S. Engineer's Office
751 S. Figueroa Street
Los Angeles 55, California

Office of the District Engineer
U. S. Engineer's Office
1709 Jackson Street
Omaha 2, Nebraska

Office of Division Engineer
U. S. Engineer's Office
Southwestern Division
1114 Commerce Street
Dallas, Texas

Office of the District Engineer
U. S. Engineer's Office
Box 1538
Albuquerque, New Mexico

Office of the District Engineer
U. S. Engineer's Office
4735 E. Marginal Way
Seattle 4, Washington

Office of the District Engineer
U. S. Engineer's Office
Foot of Prytania Street
New Orleans, Louisiana

or at;

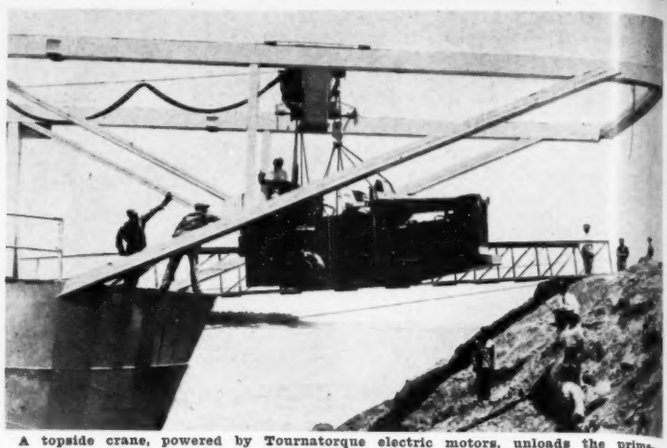
Panama Canal Company, 24 State St., New York 4, N.Y.

Strike Back!

GIVE

TO CONQUER CANCER

Mr. and Mrs. Gus Dick, heading the "Ark of LeTourneau" expedition, discuss plans with R. G. LeTourneau—who is Mrs. Dick's father.



A topside crane, powered by Tournatorque electric motors, unloads the prime-move portion of a Model C Roadster Tournapull from the "Ark".

Offers Fuller Life To People of Liberia

If Noah had heard about bulldozers, there would never have been room for all those animals in his Ark. He did, however, take aboard pretty well everything necessary to support life, and in this respect the new "Ark of LeTourneau" resembles the original model.

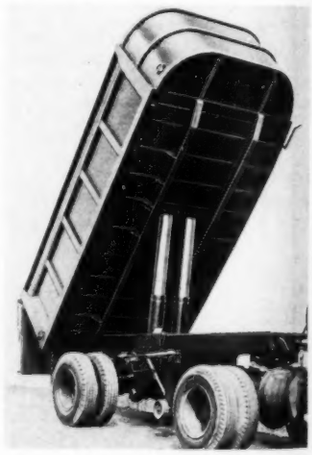
This latest ark, whose real name is MS Robert G. LeTourneau, is a converted LSM. Named for the head of R. G. LeTourneau, Inc., Peoria, Ill., it is taking part in a combined missionary and industrial-development expedition organized by a newly created Liberian corporation called LeTourneau of Liberia, Ltd. This corporation, a subsidiary of LeTourneau Technical Institute, Longview, Texas, is taking the Institute's "earn-learn" program to the people of Liberia and at the same time spreading the Gospel among the natives.

Mr. LeTourneau likes to call himself "God's businessman", and he feels that the best way to get people to listen to spiritual teaching is to show them at the same time how they can build a better material life for themselves with the help of modern machinery. The "Ark", purchased and outfitted at a total cost of $250,000, made the trip from New Orleans, La., to Baffu Bay, Liberia, carrying some 26 people and a cargo of construction machinery valued at $700,000. The personnel, headed by Mr. and Mrs. Gus Dick of Longview, Texas, son-in-law and daughter of Mr. LeTourneau, plan to develop a new community at Tournata, on the coast, and train the natives in the operation of the machinery. Earth-fill dams will be constructed for power supply and the resulting lakes will be stocked with fish. Another use for the construction machinery will be to build roads needed to get equipment in to clear the land for agricultural purposes.

The Baffu Bay area of Liberia is jungle at the present time, so the expedition expects to encounter hardships comparable to those the pioneers in this country experienced. But everyone feels the job is worth doing, and help is coming, too, from the Technical Cooperation Administration of the U. S. Government, from the Department of Agriculture, and from the Liberian Government. To defray the cost of the venture, Mr. LeTourneau hopes to find markets in Europe and the United States for such products as minerals, mahogany, rosewood, and ironwood. The investment of $1,000,000 is well worth the cost, thinks Mr. LeTourneau, if it fulfills the double goal of the expedition—to better the spiritual condition of the natives, and at the same time help feed them and raise their standard of living.

New Trailer Dumps

A new line of 20-cubic-yard-capacity single-axle packaged trailer dumps is announced by The Galion Allsteel Body Co., Galion, Ohio. The Model 12 is constructed of 10-gage steel. It is 88 inches wide inside and has 32-inch sides and 44-inch ends. Standard equipment includes 12-inch steel removable side boards. Length can be varied up to 18 feet.



Dumping is handled by a Galion Model 77142 hoist. This consists of two 7-inch twin-ram single-stage telescopic cylinders. Rated hoist capacity is 18 tons.

The trailer suspension is of heavy-duty alloy main and auxiliary springs, one fixed and one adjustable radius rod, with flat-top frame section. It is furnished with either a power fifth wheel or wet hose mounting. Tire sizes and brakes are available in several options for individual requirements.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 890.

Hooper Joins Engineer Firm

Curtis J. Hooper has joined Parsons, Brinckerhoff, Hall & Macdonald, New York, N. Y., Consulting Engineers. As an associate, he will be in charge of the Traffic and Planning Division and will act as principal assistant to Lawrence S. Waterbury, a partner of the firm. Mr. Hooper was formerly Director of the Bureau of Traffic-Planning-Design for Connecticut.

White Heating Kettles Have Fire-Proof Tops

Cut-back and highly inflammable road repair material can be heated safely in White kettles. FIRE-PROOF top reduces fire hazard.

White asphalt and tar kettles are extensively used. They give long life and satisfaction.

Plain kettles or with hand or engine driven spray pumps for patching pavement. Thermometer, barrel hoist, warming hood extra. All oil burning. Semi-elliptic springs, pneumatic tires.

65, 110, 165, 220, 300-gallon capacities.

Model F-10 is oil jacketed, to heat elastic joint filler.

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White Mfg. Co.

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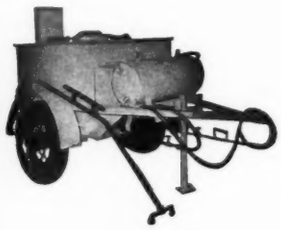

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CONCRETE VIBRATORS
Gasoline Engine and Electric Motor Driven Models

ASPHALT PLANTS
Portable—Stationary

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for Industrial Tractors

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HOISTING MACHINE
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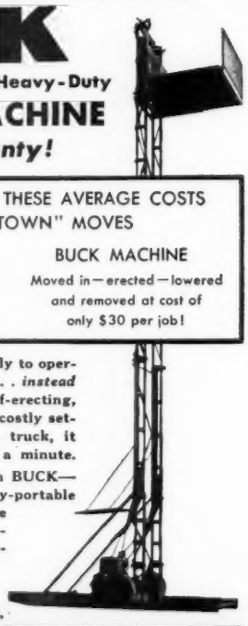
Save *plenty* on *every* job with BUCK—the *only complete* automatically-portable heavy-duty hoisting machine in the world. Get the money-saving, time-saving, labor-saving facts today!



Still several dealerships available.

BUCK EQUIPMENT CORP.

208 Butler Street Cincinnati 2, Ohio

Six-Building Rayon Plant Rises Rapidly

Tilt-Up-Wall Construction Speeds Erection of Courtaulds' Modern Staple-Fiber Plant in Alabama

• THE new rayon plant of Courtaulds (Alabama), Inc., now being built near Mobile, Ala., is to be the most advanced rayon staple-fiber plant in the world. The H. K. Ferguson Co., Inc., Cleveland, Ohio, industrial-engineer and building firm, is responsible for the engineering and building of the plant.

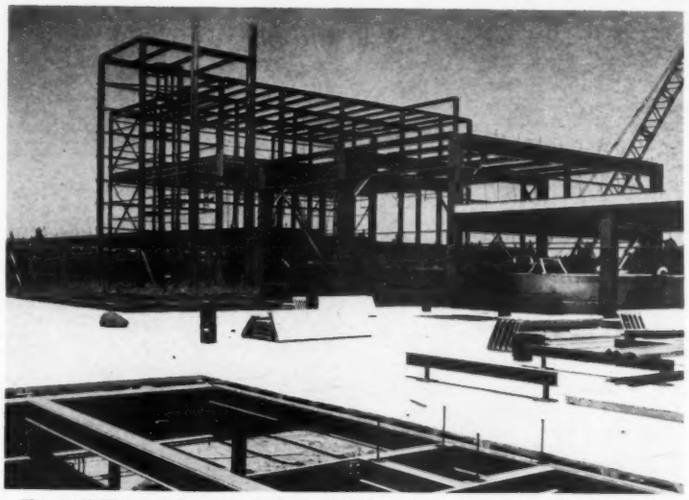
The plant, which is being erected on a 550-acre site, will consist of six principal buildings: the main manufacturing building; a storage and maintenance building; an administration building; a boiler house; a gatehouse; and a fan house. It is expected that the plant will be in full production by 1953.

Preliminary work, started in late August of 1951, included clearing the site of more than 100 acres of dense timber—which was utilized for the manufacture of pulpwood—and the construction of temporary roads and buildings. Test borings indicated the presence of good bearing clay, and although the design called for a loading of 3,500 pounds per square foot, most of the soil was able to take a load of 10,000 pounds per square foot without exceeding the safety limit.

The first building completed was the storage and maintenance building, a one-story structure, 180 x 400 feet, which contains machine, carpentry, electrical, instrument, blacksmith, pipe, and boiler shops; maintenance, chemical, and paint stores; a fire station; and locker rooms for maintenance personnel. Steel erection for the main manufacturing building, which is almost ¼ mile long and 180 feet wide, was recently completed. This building consists of one, two, and three-story sections, with a partial basement in order to permit gravity flow to process tanks.

Tilt-Up-Wall Technique

Construction details are basically the same for all buildings, except the administration building, which is still in the design stage. Framework is of structural steel, and the roofs consist of precast lightweight-aggregate slabs.



The partially-completed manufacturing building of Courtaulds' Mobile, Ala., plant. The picture shows light weight-aggregate slab construction used on the roof. The H. K. Ferguson Co., Cleveland, Ohio, is engineer and builder.

The wall construction is two-part: the upper part consists of corrugated asbestos siding hung from the structural steel; the lower part consists of precast concrete sections. For the latter Ferguson developed its own variation of the "tilt-up-wall" technique. The following is a description of the technique as used in the construction of the maintenance building.

Some 61 precast wall panels were used, all 5 feet high, but in 15 different lengths varying from 1 foot 1 inch to 33 feet 4 inches. There were 22 of the most common size, 22 feet 5 inches, and 26 of the 61 pieces had different settings for inserts.

In order to save time before erecting the steel and pouring the permanent concrete floor slabs, it was decided to cast the wall panels and then stack them for ready use, rather than pour them in the so-called tilt-up position usually adjacent to the final setting position. For this purpose, a base slab, approximately 45 x 90 feet, was poured in a corner section of the building. The base slab was given a hard trowel-smooth finish and treated to prevent bonding with the walls to be cast.

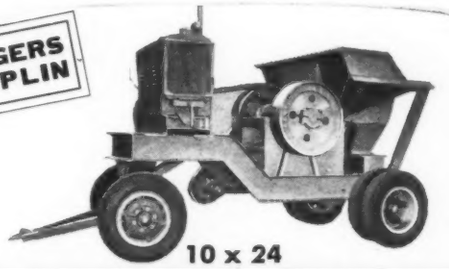
Lumber in 2 x 6-inch lengths was used for the wall forms. The side forms were run 5 feet apart, parallel to the long side of the base slab, and the end forms were then set between the side forms. Approximately 2-foot spacing was allowed between the end forms of adjacent sections so that the bond with the base slab could be easily broken by jacking against the section ends. Before the forms were set, holes were first drilled in the concrete base slab with a ⅜-inch star drill. The holes were then plugged with wood and the forms spiked to the plugs. To prevent spalling on the top inside edge of the wall panels a chamfer strip was set in the forms.

Inserts for Handling and Fastening

Three inserts to hold ⅝-inch bolts were cast in each end of the panels, so that they could be fastened to the structural-steel columns with 2 x 8-inch steel straps. To permit lifting of the panels, it was found necessary to place two inserts in the top of sections under 10 feet long, and four inserts in sections over the 10-foot size. Eyebolts of ⅝-inch size were placed in these inserts to hold the 4-way pickup sling. (In other buildings, anchor bolts were also set in the top of panels to

(Concluded on next page)

ROGERS JOPLIN



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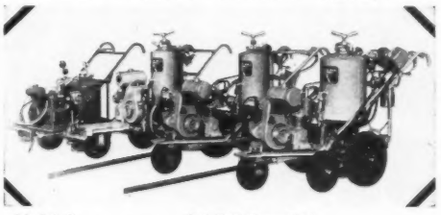

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Heavy Duty Model C B-3-P Self Propelled

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shown, are basic portable models from our "family" album. See our many other types for conventional or special applications.

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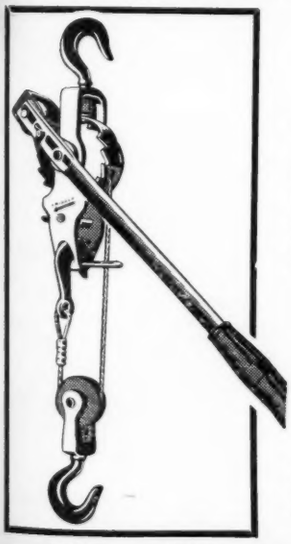
There is a Kelly-Creswell Model that will solve your traffic problem.
For information on complete units or replacement parts write to:

KELLY-CRESWELL CO.
XENIA, OHIO

Kelly Creswell Air-Curtains — A Patented Feature

FEATHERWEIGHT TOOL LIFTS, LOWERS, PULLS 1½ TONS



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Send for FREE Bulletin #116, a newly published four-page brochure with 25 "How-to-Hoist" illustrations. Better yet, order your first LUG-ALL today. Factory pre-tested—guaranteed for one year.

LUG-ALL has oiled-for-life bearings. Safety handle. Pre-formed aircraft cable. A real tool.

$35.25 FOB FACTORY

THE LUG-ALL COMPANY
WYNNEWOOD 2, PENNA.

Give Generously to the Red Cross

Six-Building Rayon Plant Rises Rapidly

(Continued from preceding page)

hold window-frame risers.)

The inside of the panels was poured face down, and the inserts formed on the base slab. After carefully locating the position of the inserts, small holes were drilled in the base slab and the holes plugged with wood. The inserts were then nailed to the plugs with small nails, so that only slight jacking action would be necessary to shear the nails.

After the panels were poured and allowed to set for three or four days, the forms were stripped by using 5-ton jacks between ends of wall panels, as well as the sides of adjacent panels. The panels were lifted and stacked by a 15-ton crane using three 10-inch sheaves and three $\frac{5}{8}$-inch cable slings in the following manner:

The top sheave was hooked to the crane cable. One of the cable slings was passed through the top sheave and each end of the sling was hooked to the other two sheaves. Each of the lower sheaves had a sling cable passed through it, with ends of each sling fastened to the $\frac{5}{8}$-inch eyebolts set in the top of the panels.

Ferguson's men lower the precast wall panels into place with a motor crane.

When the time came to install the wall panels, a motor crane picked them up from where they were stacked and set them at the proper location on concrete grade beams. Originally, expansion-joint material was tried between the grade beam and the base of the panels. However, it was soon discovered that the expansion-joint material would not take up any unevenness in the bearing surfaces. Consequently, it was discarded in favor of shimming the panels to the correct elevation, using wooden wedges. A cement finisher was then dry-packed between the wall slab and the grade beam. Between adjoining slabs, a premolded asphalt expansion joint, faced with caulking compound, was installed.

Continuous Pouring of Concrete

As the design for each section of the plant is completed, plans are rushed to the plant site and construction crews swing into work. Careful planning on the part of Project Manager James N. Barnes, of the Ferguson Co., and his crew has permitted close adherence to construction schedules. A typical example of this planning was the pouring of the spinning-room operating floor. The reinforced-concrete columns and floor, including bases for spinning machines, special floor troughs, and inserts for vitrified-clay-tile outlets, were installed in one continuous pour, starting at 6 o'clock in the morning and finishing at 3 o'clock the next morning. The concrete forms were particularly intricate, because the floor pitched in four different directions at different angles, and the degree of slope varied from one floor section to another. Also, the vitrified-tile inserts had to be correctly placed within $\frac{1}{8}$ inch. All told, approximately 350 cubic yards of concrete was poured.

A unique feature of the plant is the use of water-flooding of the building roofs during the summer months. A $\frac{3}{4}$-inch layer of water covers the roofs, so that the evaporation of the water will serve to cool the ceiling below.

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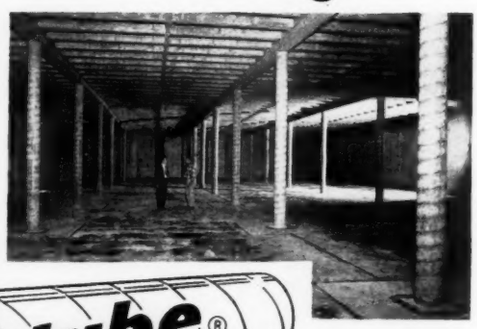

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Data on Force-Feed Loader

Information on the force-feed Hi-Loader is contained in a booklet issued by Athey Products Corp., 5631 W. 65 St., Chicago 38, Ill. The unit is designed for high-speed loading from stockpile or windrow. It loads up to 25 cubic yards a minute.

The booklet contains illustrations, complete specifications, and dimensions. It lists available attachments.

This literature may be obtained from the company, or by using the Request Card bound in at page 18. Circle No. 853.

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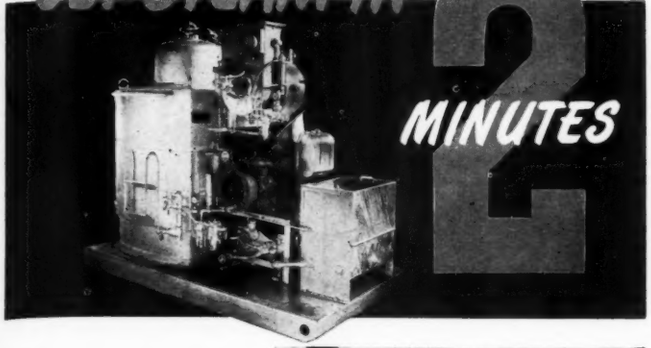

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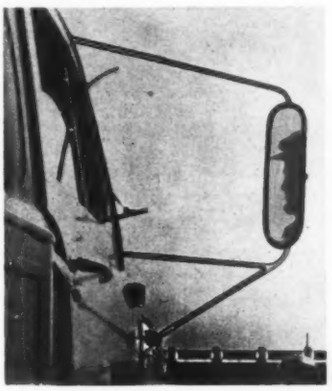
Rear-View Cab Mirror

A truck mirror that is said to eliminate blind spots and give better rear-view vision has been introduced by The Kampa Co., 5715 S. 11th Ave., Minneapolis, Minn. Driv-Eez mirrors are completely hand-adjustable to any position, including in and out, complete circle, and vertical for different-height drivers. They also have tipping adjustment for eliminating the blind spots along the side of the truck.



Their tubular construction is said to prevent vibration, and the brackets and mirror fold back harmlessly against the cab upon impact from either direction.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 953.

New Moly-Manganese For Manual Welding

A moly-manganese material for manual welding and for automatic electric application has been announced by Stoody Co., 1136 W. Slauson Ave., Whittier, Calif. The new electrodes contain 14 to 15 per cent manganese, with deposits showing full Hadfield properties.

Physical properties of bare moly-manganese as deposited are: Rockwell hardness, 85-90 B; cold worked, 43-47 C; tensile strength 100,000 psi; yield strength, 85,000 psi; elongation in 2 inches, 14 per cent; deposits non-magnetic.

The moly-manganese electrode is designed primarily as a build-up material for manganese steel parts. Deposits of the bare rod possess maximum physical properties and have weldability closely approaching the conventional coated electrodes. The material is available in 14-inch lengths and $^{5}/_{32}$, $^{3}/_{16}$, and $^{1}/_{4}$-inch diameters.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 911.

President of Two Companies

Erwin S. Wolfson is the newly elected President of Diesel Electric Co., Inc., and Diesel Construction Co., Inc., New York, N. Y. Formerly Vice President of the two companies, Mr. Wolfson succeeds the late Saul Lautenberg.

For Diesel Construction Co. Mr. Wolfson has recently directed projects including broadcasting, motion-picture, and television studios and laboratories in New York City, as well as apartment, office, and theater buildings. In his work with Diesel Electric Co., he supervised installation of power plants in a number of Manhattan office buildings.

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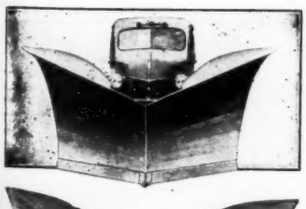

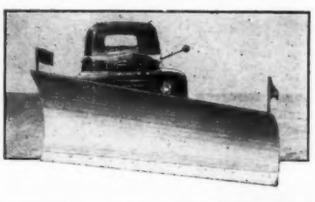

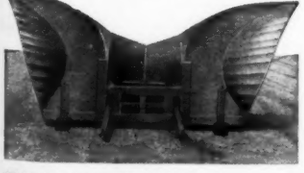

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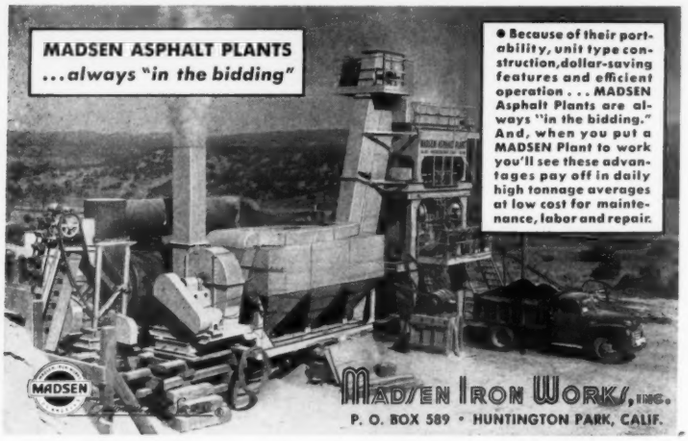
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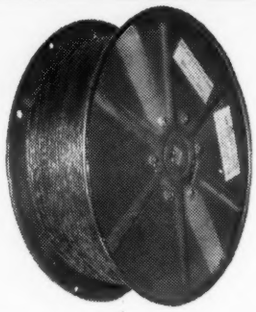

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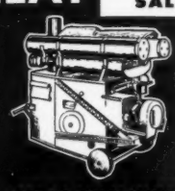

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INDEX TO ADVERTISERS

Acrow, Inc. 5
Aetna Casualty & Surety Co. 14
Allis-Chalmers Tractor Div. 54, 55
Allison Div. of GMC 75
All-Purpose Spreader Co. 74
American Bosch Corp. 27
American Hoist & Derrick Co. 36, 44
American Manganese Steel Div. 7
Anthes Force Oiler Co. 79
Arrow Tools, Inc. 48
Austin-Western Co. 85

Baldwin-Lima-Hamilton Corp. 13
Ballard, C. L. 80
Barber-Greene Co. 17
Baumann, Arthur C. 100
Bethlehem Steel Co. 71
Blum Co., Inc., Julius 93
Bradford Machine Tool Co. 34
Briggs & Stratton Corp. 99
Buck Equipment Corp. 102
Bucyrus-Erie Hydrocrane Div. 49
Buffalo-Springfield Roller Co. 97

Canton Mfg. Co. 88
Carver Pump Co., The 72
Casey & Case Foundation Co. 71
Caterpillar Tractor Co. 22, 23
Central Engineering Co., Inc. 7
Chicago Pneumatic Tool Co. 59
Chrysler Corp., Industrial Engine Div. 81
Cimco 104
Cleco Div., Reed Roller Bit Co. 16
Cleveland Trencher Co. 96
Clipper Mfg. Co. 67
Colorado Fuel & Iron Corp., (Wickwire Spencer Steel Div.) 56
Concrete Pipe Machinery Co. 63
Concrete Surfacing Machinery Co. 106
Construction Machinery Companies 69
Crockett Bros. 35
Curta Calculator Co., Inc. 78

Detectron Co. 58
Dewey & Almy Chemical Co. 96
Diamond Chain Co., Inc. 95
Dodge Div. of Chrysler Corp. 37
Dorsey Trailers 52
Drott Mfg. Corp. 84
Dudgeon, Inc., Richard 75

Eaton Mfg. Co. 77
Economy Forms Corp. 52
Embury Mfg. Co. 8
Essick Mfg. Co. 36
Euclid Road Machinery Co. 12

Flexible Steel Lacing Co. 86
Flink Co. 88
Ford Motor Co., Industrial Engine Dept. 6
Foundation Equipment Corp. 67
Fulton Bag & Cotton Mills 86

Gar-Bro Mfg. Co. 34
Gar Wood Industries, Inc., Findlay Div. 46, 47
Giles Drilling Corp. 69
Gladden Products Corp. 93
Gledhill Road Machinery Co. 105
Gold Foundry & Machine Works 39
Goodrich Co., B. F. 69
Griffin Wellpoint Corp. 60
Gurley, W. & L. E. 45

Habco Mfg. Co. 105
Hagan Tubular Products 91
Harnischfeger Corp. 65
Hayward Co. 70
Heltzel Steel Form & Iron Co. 88
Hendrix Mfg. Co., Inc. 61
Hough Co., Frank G. 25

International Harvester Co., Indus. Power Div. 32, 33
International Mfg. Co. 90
Iowa Mfg. Co. 30, 31, 58

Jackson Mfg. Co. 62
Jackson Vibrators, Inc. 87
Jaeger Machine Co. 74
Johnson, C. S. 51

Kelly-Creswell Co. 103
Klinglehofer Machine Tool Co. 44
Koehring Co. 51
Kolman Mfg. Co. 92
Koppers Co., Inc. 35
Kwik-Mix Co. 50

Lansing Co. 73
LeBus Rotary Tool Works, Inc. 101
Le Tourneau, Inc., R. G. 108
Link-Belt Speeder Corp. 38
Littleford Bros., Inc. 105
Lombard Governor Corp. 9, 37
Lug-All Co. 103

Madsen Iron Works, Inc. 106
Maginnis Power Tool Co. 36
Mall Tool Co. 44
Marsh Co. 6
Martin Machine Co. 107
Marvel Engineering Co. 15
Marvel Equipment Corp. 76
Master Vibrator Co. 78
McConnaughay, K. E. 99
McKiernan-Terry Corp. 70
McKinney Drilling Co. 102
McKissick Products Corp. 8
Messenger, Frank D. 16
Michelin Tire Corp. 9
Miller Research Engineers 91
Miracle Decal Co. 106
Monarch Road Machinery Co. 45
Morin Manufacturing Co., Inc. 105
Motorola, Communications & Electronics Div. 60

New England Carbide Tool Co., Inc. 72
Northwestern Auto Parts Co. 98

Ohler Machinery Co. 13
Oliver Corp. 18
Onan & Sons, Inc., D. W. 98
Owen Bucket Co. 91

Panama Canal 101
Parsons Co. 51
Petersen Engineering Co. 48
Philadelphia Textile Finishers, Inc. 104
Pioneer Engineering Works 28, 29
Pippin Construction Equipment Co., Inc. 90

"Quick-Way" Truck Shovel Co. 39
Quinn Wire & Iron Works 57

Redman Trailer Co. 76
Rice Pump & Machine Co. 94
Ridge Tool Co. The 93
Rockford Clutch Div. 94
Roeth Vibrator Co. 25
Rogers Iron Works Co. 103
Rosco Mfg. Co. 34
Rucker Co. 74

Sasgen Derrick Co. 59
Scheu Products Co. 8
Schramm Inc. 57
Seaman Motors, Inc. 41
Servicised Products Corp. 49
Shell Oil Co. 19
Shunk Mfg. Co. 77
Slope Meter Co. 92
Smith Engineering Works 89
Sonoco Products Co. 104
Sprague & Henwood, Inc. 15
Standard Oil Co. (Ind.) 53
Sta-Vis Oil Co. 100
Sterling Wheelbarrow Co. 104
Stow Mfg. Co. 84
Stoody Co. 20, 21
Stulz-Sickles Co. 48
Swenson Spreader & Mfg. Co. 106
Symons Clamp & Mfg. Co. 56

Termite Drills, Inc. 86
Texas Co. (Asphalt) 3
Texas Co. (Lubricants) 10, 11
Thew Shovel Co. 26
Thomas Foundries, Inc. 80
Thurman Machine Co. 100
Tilden Tool Mfg. Co. 66
Timken Roller Bearing Co. 63
Torrington Co. 41
Trackson Co. 83
Transport Trailers, Inc. 38
Tulsa Winch Div. 68

Ulrich Products Corp. 79
Union Wire Rope Corp. 42, 43
United States Safety Service Co. 78
Universal Engineering Corp. 73

Van Brush Mfg. Co. 53
Vibro-Plus Products, Inc. 98
Vulcan Iron Works 94
Vulcan Tool Mfg. Co. 83

Warren Foundry & Pipe Corp. 72
Watson-Stillman Co. Distributor Products Div. 48
Waukesha Motor Co. 14
Wellman Engineering Co. 68
Wellman Co., S. K. 62
White Mfg. Co. 102
Whitestown Trencher Co., Inc. 92
Winpower Mfg. Co. 61
Winslow Scale Co. 19
Wurdack Chemical Co. 18
Wyandotte Chemicals Corp. 84
Wyoming Valley Equipment Co. 94

ONE-MAN-MOVES WITH MARTIN

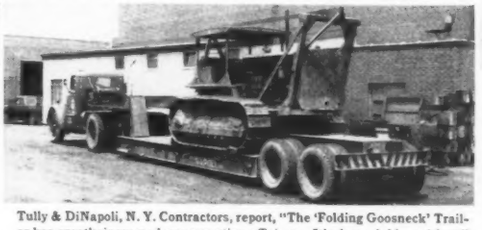
SAVES EQUIPMENT... PRODUCTION TIME!

Figure the man hours you're spending right now to load and unload your equipment . . . using ordinary methods. Multiply it by the number of moves you make each day. NOW . . . DIVIDE that figure by two, and you've the extra hours you'll keep your machine on the job . . . producing for you . . . when you make your moves with a Martin "Folding Gooseneck" Trailer! Your operator handles the entire job alone. No need to tie up a man at the truck. No blocking, cribs or ramps to build. No cross loading. The "Folding Gooseneck" Trailer forms its own loading ramp. Trailer is low built for safety . . . low clearance . . . stability.

COMPARE THESE FEATURES:

• FAST PICKUP by truck power . . . truck winch does all the lifting. One man handles the job . . . effortlessly. • RUGGED . . . heavy-duty construction. • SAFE . . . large air, vacuum or electric brakes for sure stops. • Backed by your MARTIN-"Caterpillar" Dealer service facilities.

MARTIN MACHINE CO., KEWANEE, ILLINOIS, U. S. A.

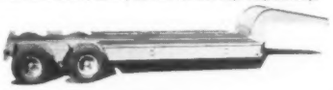


Tully & DiNapoli, N. Y. Contractors, report, "The 'Folding Goosneck' Trailer has greatly increased our operating efficiency. It's dependable and fast."

Make all your moves on Martin Trailers . . . a type and capacity to fit every need. Seven standard models.

Martin Model 333 . . . tandem axle, tilting platform. 10-ton cap. Other models in this class, 10-ton cap. Models 222 and 444.

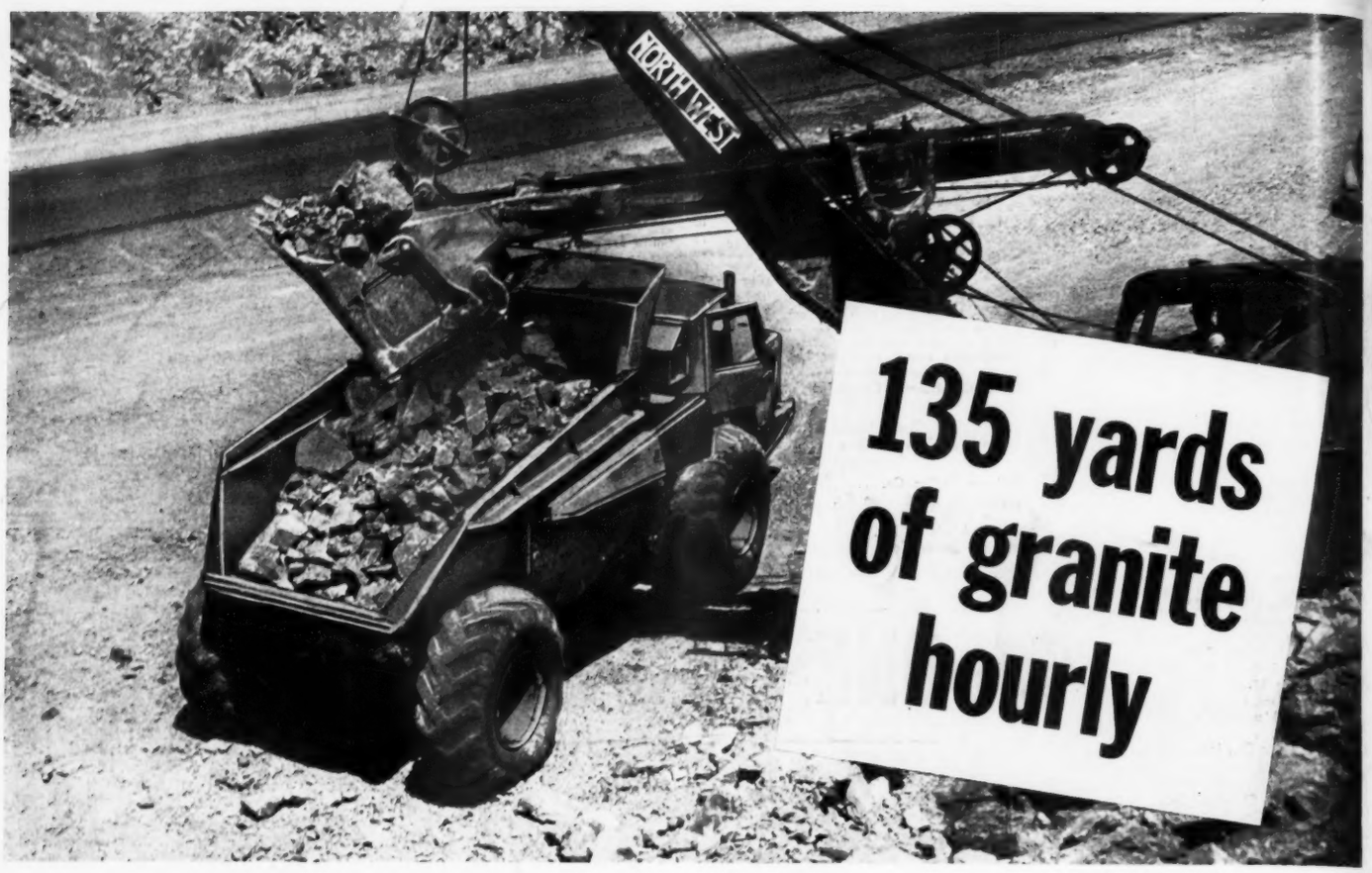
Martin Model LB2S 11-ton cap. LB3S, similar, 14-ton cap. Front end axle assembly available to convert 2-wheel to 4-wheel trailer. Other trailers in this class; tandem axle LB3T; LB4T, 20 and 27-ton cap. respectively.



Martin Model R3T . . . rear loading, tandem axle semi-trailer. 20-ton cap. Other models in this class: Model R4T and Model R5T, 27 and 32-ton cap, respectively.

MARTIN Trailer

MARTIN MACHINE CO.
KEWANEE, ILLINOIS, U.S.A.



Skousen-Hise Tournarocker hauls over 10 to 15% grades at Tijeras Canyon

When Skousen-Hise Contracting Co., Albuquerque, New Mexico, started building a new 4-lane route for U.S. 66 through the Sandia Mountains, 6 miles east of Albuquerque, the job called for a fast, maneuverable rear-dump hauler for work in restricted quarters. After careful consideration of available machines, the company decided on a 16-ton 35 m.p.h. C Tournarocker — a rig which has a turning radius of only 13′9″. Roading the electric-control "Rocker" through traffic at Tijeras Canyon, Skousen-Hise got profitable production like this on the 1,000,000-yd. project:

2400′ cycle every 6 minutes

With sideboards to increase capacity, C Roadster was loaded with approximately 15 pay yards of blasted, partially decomposed granite in 9 passes of a 1¾-yd. shovel. In spite of occasional delays which boosted average load time to 3 minutes, rig completed a 2400′ cycle every 6 minutes . . . made 9 trips, delivered 135 pay yards per hour. Haul to fill included 240′ of 15% downgrade, 100′ of 10% adverse grade. Haul speed averaged 11 m.p.h.

"Can't beat Tournarocker" says Superintendent Isbell

With 2500 hours on the machine, owners are very satisfied with Tournarocker's steady performance. Running almost 100 days ahead of a 400-day schedule because of good weather and high production, Job Superintendent Andy Isbell says, "For maneuvering around in rocks and tight places, you can't beat the Tournarocker."

Check other job reports

Whenever you have dirt or rock to move, it will pay you to check the high output and low costs other contractors are getting with LeTourneau rear-dumps, bottom-dumps, and Carryall-Scrapers. See your LeTourneau Distributor for job-proved facts and figures on work like yours.

R. G. LeTOURNEAU, INC.
Peoria, Illinois

LETOURNEAU LET EQUIPMENT

Rig dumps 15-yd. load in 10 seconds. "I like its positive steering and easy operation," says Operator McElroy.

"Tournarocker operates as easy on curves and hills as it does on level ground," says Operator George D. McElroy. Big 4-wheel air brakes (3763 sq. in. total braking surface) provide complete safety throughout haul cycle.

Carryall, Tournarocker—Trademark Reg. U. S. Pat. Off. R-45-H-a